

# **MOTORUP EVALUATION AND MARKET ASSESSMENT**

**Prepared for**  
**MotorUp Working Group**

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<b>SECTION 1</b>	<b>INTRODUCTION .....</b>	<b>1-1</b>
1.1	MotorUp Overview .....	1-1
1.2	Study Objectives .....	1-1
1.3	Research Activities .....	1-2
1.4	Structure of Report.....	1-3
<b>SECTION 2</b>	<b>MARKET STRUCTURE AND SIZE.....</b>	<b>2-1</b>
2.1	Market Structure .....	2-1
2.1.1	Manufacturers .....	2-2
2.1.2	Motor Distributors .....	2-4
2.2	Market Size .....	2-4
2.3	Market Share of Premium Motors .....	2-6
2.4	Motor Pricing.....	2-7
<b>SECTION 3</b>	<b>SUPPLY SIDE CONDITIONS .....</b>	<b>3-1</b>
3.1	Overview of Manufacturer Findings.....	3-1
3.2	Detailed Manufacturer Findings .....	3-3
3.3	Overview of Dealer/Distributor Findings .....	3-4
3.4	Detailed Dealer/Distributor Findings.....	3-6
3.4.1	Profile of Motor Dealers .....	3-7
3.4.2	Motor Sales .....	3-8
3.4.3	Motor Pricing.....	3-11
3.4.4	Promotion of Premium Motors .....	3-13
3.4.5	Stocking Practices.....	3-15
3.4.6	Rewind and Repair Business .....	3-18
3.4.7	Perceptions of Customer Demand .....	3-20
<b>SECTION 4</b>	<b>DEMAND SIDE CONDITIONS .....</b>	<b>4-1</b>
4.1	Overview of End User Findings .....	4-1
4.2	Detailed End User Findings .....	4-4
4.2.1	Research Plan.....	4-5
4.2.2	Respondent Characteristics.....	4-9
4.2.3	Knowledge of Efficiency Standards .....	4-10
4.2.4	End-User Motor Inventory and Applications .....	4-12
4.2.5	Motor Purchasing Practices .....	4-14
4.2.6	Perceptions of Premium Motors .....	4-22
4.2.7	OEM Equipment .....	4-23
4.2.8	Wait Times.....	4-24
4.2.9	Repair Practices .....	4-26

4.2.10 DOE Motor Program.....	4-29
<b>SECTION 5 PROGRAM EVALUATION.....</b>	<b>5-1</b>
5.1 MotorUp Overview .....	5-1
5.2 Analysis of the MotorUp Initiative .....	5-2
5.3 Initiative Response.....	5-4
5.3.1 Dealer/Distributor Response .....	5-5
5.3.2 End User Response .....	5-8
5.4 Program Comparison .....	5-11
5.4.1 Overview .....	5-11
5.4.2 Evolution and Convergence of Programs .....	5-12
5.4.3 Brief Descriptions of Motor Efficiency Programs.....	5-12
5.4.4 Summary Comparisons Among Programs.....	5-16
5.4.5 Summary of Program Comparison .....	5-17
5.4.6 Key Lessons Learned.....	5-19
<b>SECTION 6 CONCLUSIONS &amp; RECOMMENDATIONS .....</b>	<b>6-1</b>
6.1 Key Findings.....	6-1
6.1.1 Manufacturers .....	6-1
6.1.2 Distributors .....	6-2
6.1.3 End Users .....	6-2
6.1.4 Initiative Assessment .....	6-4
6.2 Context for Interpreting Key Results.....	6-4
6.3 Recommendations.....	6-8
6.3.1 Recommendations on Initiative Design.....	6-8
6.3.2 Recommendations on Initiative Operations.....	6-9

This is the final report of the MotorUp Market Assessment and Evaluation for the MotorUp Working Group. The study updates the 1999 Baseline study and provides a comprehensive Market Transformation and Initiative Assessment of the MotorUp initiative.

## **1.1 MOTORUP OVERVIEW**

Since May 1998, the MotorUp working group has sponsored a regional motor rebate program targeted at integral horsepower motors purchased through distributors and dealers in the Northeast. The objective of the initiative is to transform the Northeast market by substantially increasing use of energy efficient motors in applications where economically justified. The initiative is coordinated by NEEP (Northeast Energy Efficiency Partnerships, Inc.) and sponsored by electric utilities and efficiency administrators including: NSTAR, Conectiv Power Delivery Co., National Grid USA, Northeast Utilities (CT, MA and NH), Public Service Electric and Gas Company (PSE&G), Efficiency Vermont, Unitil/Fitchburg Gas and Electric, United Illuminating (UI), Long Island Power Authority (LIPA) and GPU Energy. The initiative was established to create a common program across the region covered by the 12 sponsoring utilities.

Field implementation of MotorUp is administered by Applied Proactive Technologies (APT), which has a program manager, program coordinator, and four field representatives covering eastern New England, western New England, Long Island, and New Jersey. APT markets MotorUp primarily through motor distributors and dealers – for the most part APT staff does not contact the end-user directly. Marketing to end-users is performed individually by each of the sponsors via their C&I customer representatives. APT staff does, however, provide some technical information and promotional materials to the distributor to pass on to the end-user. Recently, a quarterly newsletter and a direct mail piece have been developed for end-users.

A rebate is issued to the end-user for purchase of CEE qualifying motors designed to cover about one-half of the cost differential between CEE and standard EPA models. The motor must meet certain operational criteria, particularly over 2,000 hours of use per year. Beginning in August 2000 a payment of \$25 has been made to the distributor for each application processed. This can be paid to the sales representative or retained by the business owner or manager. To receive a rebate, participants are required to submit information about the sale – the company, tax identification numbers, utility, motor information, and motor application among other information.

## **1.2 STUDY OBJECTIVES**

The purpose of this report is to characterize the commercial and industrial markets for premium efficiency integral horsepower motors and the impacts that MotorUp has had, including specific measures of market transformation progress. A more thorough understanding of market

dynamics, segmentation, barriers, costs and participant motivations will assist in determining whether improvements are needed in program offerings, outreach, administration or other aspects of MotorUp.

The primary objectives of the report are to assist the Working Group sponsors in:

1. ***Assessing market barriers and the progress that has made in increasing the market share of qualifying motors and facilitating market transformation in the region.*** This provides an understanding of what has been accomplished and what remains to be accomplished in qualifying motor penetration and market transformation.
2. ***Evaluating the effectiveness of the MotorUp Initiatives strategies and implementation activities in marketing, administration and meeting program goals.*** This provides an understanding of how well the program strategies match market realities and requirements, how effectively they have been implemented and how successful they have been in achieving results.
3. ***Identifying possible improvements in the MotorUp Initiative's strategies and implementation activities to increase qualifying motor market share and market transformation.*** This provides an understanding of possible market-based and performance-assessed options and recommendations for improving the program's results over time.

### 1.3 RESEARCH ACTIVITIES

The first major task of the study involved a preliminary market assessment designed to identify major issues and develop hypotheses (Table 1-1). In-depth interviews were conducted with program staff and sponsor C&I representatives to gather information and perspectives on the program. In addition, in-depth interviews were conducted with dealers and end users who participated in MotorUp regarding their perceptions and practices. Several manufacturer representatives were also interviewed about market trends, promotional strategies, and program knowledge. These manufacturers were also asked to provide detailed sales information on premium motors. Lastly, information was gathered about other premium motor programs, including interviews with program managers.

In the second major task of the study, large-scale computer aided telephone interviewing (CATI) surveys were administered to both dealers/distributors and end users. This research yielded information on the stocking, sales, pricing, promotional, and repair practices of motor dealers and distributors. The end user survey focused on stocking, purchasing, and repair practices as well as experience with premium motors. In addition, both surveys probed the response of participants to the MotorUp Initiative. The surveys were administered to a random sample of dealers, selected from the marketing database of program contractor Applied Proactive Technologies (APT). This database included both program participants and non-participants. Quotas for the end user surveys were allocated based on motor energy consumption, which was estimated using the SIC code, the size of the organization, and energy usage data. The end user

survey interviewed motor decision-makers from commercial, institutional, and industrial establishments. The final piece of the market research involved the analysis of manufacturer pricing data to estimate the incremental costs of premium motors.

**Table 1-1: Overview of Research Activities**

Project Task	Research Item (# Completed Surveys)
Preliminary Assessment	<ol style="list-style-type: none"> <li>1. In-depth interviews with MotorUp staff and sponsor C&amp;I representatives</li> <li>2. In-depth interviews with participating dealers (12) and end users (9)</li> <li>3. In-depth interviews with manufacturer representatives (7), including collection of motor sales data</li> <li>4. Review of other premium motor programs, including interviews with managers</li> </ol>
Market Research and Analysis	<ol style="list-style-type: none"> <li>1. CATI surveys with dealers and distributors (100)</li> <li>2. CATI surveys with end users (220)</li> <li>3. Motor pricing research</li> </ol>

## 1.4 STRUCTURE OF REPORT

The remaining sections of this report cover the following topics.

- **Section 2: Market Structure and Size.** This section discusses the structure and size of the market for integral electric motors in the northeastern U.S., including key players such as manufacturers and distributors. In addition, we present estimates of the penetration of premium motors.
- **Section 3: Supply Side Conditions.** In this section we discuss the research findings concerning the two major supply-side actors: manufacturers and dealers/distributors. For each group, an overview of the key barriers to the further promotion of premium efficient motors is presented. In addition, one or more indicators have been identified to measure the change in the perceptions or practices associated with each barrier. These barriers and indicators are then briefly discussed, followed by a more detailed analysis of findings.
- **Section 4: Demand Side Conditions.** This section discusses the research findings concerning the demand side of the electric motor market. An overview is presented of the key barriers to the further penetration of premium efficient motors with end users. In addition, one or more indicators have been identified to measure the change in the perceptions or practices associated with each barrier. These barriers and indicators are then briefly discussed, followed by a more detailed analysis of findings.
- **Section 5: Program Evaluation.** In this section we present a summary of the program's design and administration as well as an analysis of program results. The responses of

both dealers and end users to the program are also discussed. Finally, we compare information from various premium motor programs throughout the country and assess their attributes.

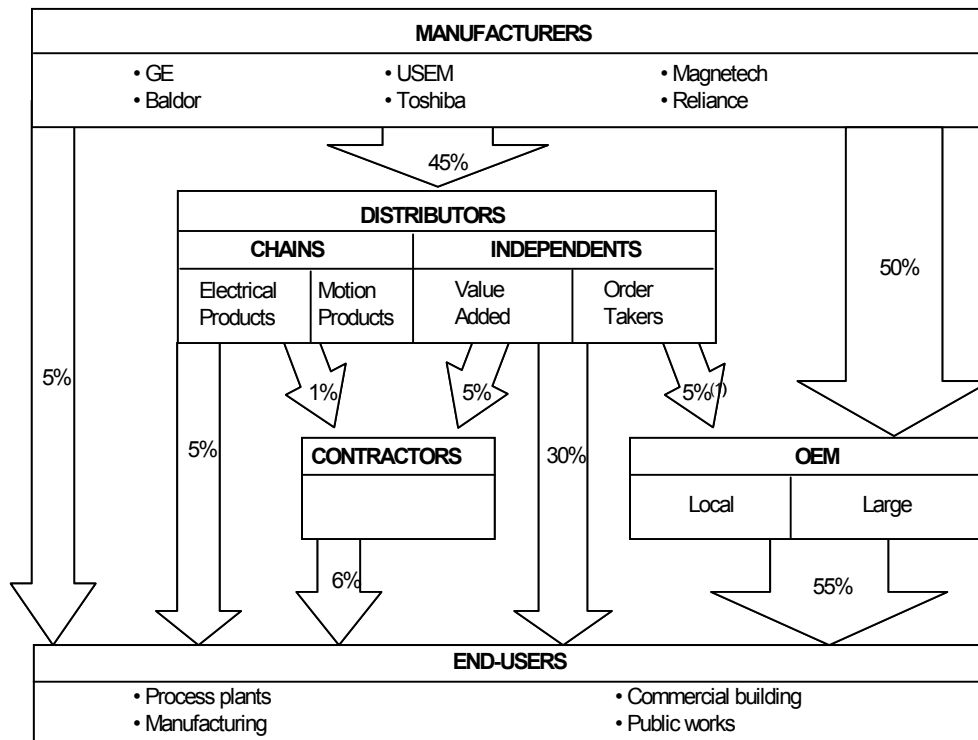
- ***Section 6: Conclusions & Recommendations.*** This section presents our suggestions for program design, operations, and evaluation in light of the findings presented.

This section discusses the structure and size of the market for integral electric motors in the northeastern U.S., including key players such as manufacturers and distributors. In addition, we present estimates of the penetration of premium motors.

## 2.1 MARKET STRUCTURE

The market for integral motors in the Northeast is structured as a classic industrial components distribution. Figure 2-1 shows the four levels in the distribution chain from the manufacturer of motors to the end-user in industrial plants and commercial establishments. The percentages shown represent estimates of the portion of sales of integral motors flowing through the respective channel. Note that many of the motors flowing thru OEMs are smaller integral motors.

**Figure 2-1**  
**Structure of the Motor Market**



(1) Sales from all types of distributors



### 2.1.1 *Manufacturers*

There are ten manufacturers who together supply nearly all of the Northeast market for integral horsepower motors. Each one has a somewhat distinct strategy for serving the market as shown in Tables 2-2 and 2-3.

**Baldor and USEM are the top suppliers to the market.** Each offers an extensive line of EPAct and premium-quality motors, and in both cases most of their premium-quality motors meet CEE standards. Together these manufacturers account for an estimated 35 to 45% of the regional market. **Reliance**, which also offers a high quality line and once a very strong contender in the market, is struggling to regain position through a “selective distributor” marketing strategy.

**Magnetech, Leeson, Lincoln and WEG are lower-priced lines.** Distributors typically carry these lines to make it possible to offer a lower-price product for price-sensitive customers. As a group these manufacturers account for 20 to 30% of the regional market.

**General Electric** concentrates on selling through its own GE Supply and the Grainger organizations and these chains accounts for most of its distributor sales in the region. Only about 50% of GE’s premium line is CEE-compliant; however, it is redesigning its integral horsepower line and in this process all premiums will be brought up to CEE-efficiency levels. This new line is planned for market launch during the first quarter of 2002.

**Toshiba** offers a line of very high-quality higher-priced motors through a selective network of very loyal distributors. As a primary strategy, the company and its distributors strongly promote premium motor sales. As a result many of the strongest participating distributors in efficient-motor programs are Toshiba distributors.

**Table 2-1**  
**Motor Manufacturer Strategies**

<u>Manufacturer</u>	<u>Estimated Northeast Market Share <sup>1)</sup></u>	<u>Price/ Quality Strategy</u>	<u>Distribution Strategy</u>
Baldor	Major	Strong premium emphasis; above average (5-10%) prices	Many distributors supported by well-stocked local warehouse; no direct sales
USEM	Major	Solid, broad line; competitively priced	Large number of distributors; many carry as second line
Magnetek	Major	Lower price line	Lower price used to fill in distributors' primary brand
Reliance	Important	High quality premium emphasis; higher price	Two tier distribution with strong support to top distributors
General Electric	Important	Fewer CEE qualifying; redesigning line; average pricing	A few very large electrical supply distributors; GE Supply the most important, Grainger increasing
Leeson	Important	Low price line	Lower price used to fill in distributors' primary brand
WEG	Important	Low price line	Low price line. Develop a relationship with GE
Lincoln	Small	Low price line	Second price line for some distribution
Toshiba	Small	Higher price, high premium emphasis; short line	A small number of very loyal exclusive distributors who are well supported
Siemens	Small	Specialty line; generally larger motors	A few specialty distributors

**Table 2-2**  
**Motor Manufacturer Position on Premium Motors**

<u>Manufacturer</u>	<u>Estimated Northeast Market Share <sup>1)</sup></u>	<u>Position on Energy Efficiency</u>
Baldor	Major	Leader in developing a CEE qualified line
USEM	Major	Premium line now meets CEE standards
Magnetek	Major	Only partly CEE qualified
Reliance	Important	Full line of CEE qualified motors; some HP sizes only models are CEE qualified
General Electric	Important	Much of the premium line does not meet CEE standards; new higher efficiency will be offered in new design due 2002 (1 <sup>st</sup> quarter)
Leeson	Important	Only partly CEE qualified
Lincoln	Small	Only partly CEE qualified
Toshiba	Important in NE Small Elsewhere	CEE qualified, very high emphasis on quality
Siemens	Small	Only partly CEE qualified

### 2.1.2 Motor Distributors

Sales from motor distributors account for approximately 45% of the market for integral horsepower motors; large OEMs purchase 50% of the motors directly from the motor manufacturers; and 5% are purchased by a few very large end-users directly from the motor manufacturers. Distributors are local businesses that serve small purchases of motors in their immediate area. They primarily serve end-users in industrial plants and commercial establishments, but also serve contractors and small OEMs. Distributors are either independent businesses or chains.

**Independent Distributors** account for about 35% to 40% of total motor sales. Most operate from one location although a few large distributors have several branches. They typically carry two to three manufacturers lines although one will be primary. Most sell other related products such as belts, pulleys and drives although motors typically will be more than half of their sales. Importantly nearly all offer rewinding services, as an alternative to new motor purchase.

Research as shown that there is an important segmentation of distributors in their approach to the business between “order-fillers”, those that simply fill the customers request, and “value-added” service providers, who routinely offer advice, application assistance and other value-added services. The latter sell a large portion of premium motors, typically over 45% of units sold. “Value-added” distributors recognize the value they can provide the customer, as well as the higher profit dollars generated by the premium sale. They tend to be the most active participants in efficient-motor programs.

**Chain Distributors** account for nearly 10% of the volume of integral motors. These chains can be segmented into “Electrical Supply” houses such as GE Supply or Grainger or “Motion Products” distributors such as Kaman or Motion Industries. “Electrical Supply” houses offer a wide range of electrical products and components; motors are only 10% to 25% of sales. Their strategy is to provide all the electrical product needs of their customers at a competitive price. This strategy gives them minimal incentive to sell value-added products, further the range of products sold limits the expertise of the typical sales person about motors. However some local branch managers have become active in efficient motors programs. “Motion Products” distributors offer a line of belting, gearing, bearings, drives and other drive train products. They generally offer high service levels to their customers in plant surveys, standing supply arrangements, and other support. As such they can be strong supporters of efficient motor programs.

## 2.2 MARKET SIZE

As discussed below, the XENERGY/Easton Consultants team encountered some difficulties in gaining usable sales data from manufacturers for use in estimating market size and the market share of qualifying units. However the information we did develop clearly indicates that the motor market in the region has declined in the past two years. Also, data on market share

suggests that the penetration of qualifying motors increased slightly over the two years since the initial baseline study.

**Availability and quality of manufacturers data.** The most accurate estimates of the size of the regional market, including the penetration of premium motors, come from the sales data of the motor manufacturers. In this project, as part of the interviews of the eight principal manufacturers, we asked them to provide sales data for the region breaking out EPA and premium motor sales by size range, and sales for New England, New Jersey and New York.

Despite general willingness to furnish sales data, it proved difficult for manufacturers to provide the kinds of information needed to estimate market size and qualifying motor share for the MotorUp region. First, the program area covers a number of states or parts thereof, and does not correspond to manufacturer-defined territories. Manufacturers do not keep summary records by state. Second, each manufacturer has several hundred product codes that must be identified and sorted. It was also quite evident that the motor manufacturers have fewer available corporate staff to comply with our request than was the case even two years ago.

One large manufacturer and two smaller companies complied with our request fully. One large manufacturer was unable to supply the data directly but put us in touch with the Regional Sales Managers in each area. Each sales manager provided an estimate of the overall percent of sales that were premium motors, i.e. one number for each geographical region. We used the regional manager estimates by forcing them into a distribution curve that accounted for higher percentage of premiums in larger sizes and lower in smaller sizes. All of the data were then market share weighted and tabulated.

We believe we have data that is “directionally” comparable to the 1999 study.

**Decline in the regional market.** It is clear from the data that the regional market has declined in the past two years (Table 2-3). We estimate that the New England market has declined 15 to 20% since the 1999 study and New Jersey and New York have each declined 10 to 15%. This change in total motors sold must be factored into the assessment of efficient-motor program results.

**Table 2-3**  
**INTEGRAL MOTOR MARKET**

	New England Total Market (Units)	New Jersey Total Market (Units)	New York Total Market (Units)
1998 Estimate	73,000	42,000	70,000
Estimated Decline 1998 to 2000	15 to 20%	10 to 15%	10 to 15%
2000 Estimate	60,000	35,000	60,000

## 2.3 MARKET SHARE OF PREMIUM MOTORS

**Adjustments to 1999 premium market share findings.** Premium motors as a percentage of all integral motors is defined as the percentage of the premium motors that meet the CEE specifications of general-purpose motors that fall under EPAct and that are sold through distributors. However, EPAct took effect in October 1997, and at the beginning of 1998 there were large numbers of “pre-EPAct motors” (particularly small ones) available which did not meet EPAct specifications, but were general purpose 1 to 200 horsepower motors. These were sold throughout 1998, but we did not include these pre-EPAct motors in the market size calculation. However, they should have been because they would have fallen under EPAct if they had been manufactured after October 1998. This is not a problem for the 2000 data as pre-EPAct motors had been sold out of stock by that time.

The 1999 premium penetration percentages have been restated in Table 2-4.

**Table 2-4**

**UNIT SHARE OF PREMIUM MOTOR SALES BY HP RANGE  
U.S. VS. NEW ENGLAND VS. NEW JERSEY VS. NEW YORK**

		PREMIUM UNIT SHARE BY HORSEPOWER RANGE					
		Total	1 To 5	6 To 20	21 To 50	50 To 100	100 To 200
NEW ENGLAND	98 Report	32%	22%	44%	62%	67%	62%
	Restatement	22%	13%	38%	58%	66%	62%
NEW JERSEY	98 Report	17%	11%	29%	39%	57%	66%
	Restatement	10%	5%	24%	34%	57%	66%
NEW YORK	98 Report	16%	11%	20%	27%	34%	64%
	Restatement	9%	5%	15%	20%	32%	64%

**Comparison of the manufacturers reported penetration of premium motors in 2000 vs. 1998.** The analysis of the manufacturers sales records from 1998 (restated) with the sales data obtained in 2000 shows an increase in most of the motor size categories in each of the three geographical areas (Table 2-5). The specifics of the change include:

- Overall the penetration of premium motors has increased several percentage points in all regions.
- The increase in penetration of premiums in the smaller size is quite striking with 50% to 80% change for each region.

- There have been more modest increases in the 5 to 20 and 20 to 50 horsepower categories.
- In the over-50 horsepower categories there is little change, and in fact a decline in several cases.

Overall, the data suggests that there has been a noticeable increase in premium motor sales, particularly in the smaller HP sizes.

**Table 2-5**  
**Penetration of Premium Motors: 1998 vs. 2000**

		PREMIUM MOTOR SHARE BY HP RANGE					
		Total	1 to 5	5 to 20	20 to 50	50 to 100	100 to 200
New England	Restated 1998	22%	13%	38%	58%	66%	62%
	Estimated 2000	27%	20%	44%	60%	68%	65%
New Jersey	Restated 1998	10%	5%	24%	34%	57%	66%
	Estimated 2000	14%	9%	24%	40%	53%	58%
New York	Restated 1998	9%	5%	15%	20%	32%	64%
	Estimated 2000	13%	8%	22%	31%	49%	39%

**Caveats to the use of manufacturers' data.** While these numbers are useful and provide one perspective on the premium motor share, they should be viewed within the context of how they were developed:

- One major manufacturer could provide only estimated data
- Two of the four manufacturers participating this year did not participate two years ago.

And market conditions change:

- The overall market has declined with slowing industrial activity
- The industrial mix may have shifted among sectors
- Power costs have increased in some areas.

## 2.4 MOTOR PRICING

Review of the price lists of the four principal motor manufacturers reveal that EPAct motors have remained at near the prices in 1999. Table 2-6 summarizes these findings. At the same time the cost of CEE-compliant motors have declined at near 4% during the same two-year time period although the changes vary widely by horsepower. This may be due to selective price

reductions by manufacturers as well as increased market share for lower-price brands, such as WEG.

It is interesting to note that prices for CEE-qualifying motors under 20 HP declined significantly. These size categories account for 75 percent of all EPA-Act-covered units shipped and 37 percent of the value of manufacturers' shipments.<sup>1</sup> This may reflect manufacturers' efforts to promote premium efficiency equipment in smaller motor sizes, where the life-cycle cost economics of purchasing a premium are less compelling than for larger, more heavily used motors.

**Table 2-6**  
**Integral Motor Pricing: 1999 vs. 2001**

2001				1999			1999-2001		
Average Sell Price				Average Sell Price			Average Sell Price % Change	Average Sell Price Difference % Change	
HP	EPA-Act	CEE	CEE Over EPA-Act	EPA-Act	CEE	CEE Over EPA-Act	EPA-Act	CEE	CEE Over EPA-Act
1	\$ 175	\$ 226	\$ 52	\$ 175	\$ 251	\$ 76	-0.1%	-9.8%	-32.1%
1.5	\$ 182	\$ 242	\$ 60	\$ 183	\$ 268	\$ 86	-0.2%	-9.7%	-29.8%
2	\$ 196	\$ 257	\$ 61	\$ 196	\$ 292	\$ 96	0.3%	-12.0%	-37.0%
3	\$ 220	\$ 273	\$ 54	\$ 218	\$ 315	\$ 97	0.6%	-13.3%	-44.5%
5	\$ 256	\$ 319	\$ 63	\$ 239	\$ 320	\$ 81	6.8%	-0.5%	-22.1%
7.5	\$ 341	\$ 463	\$ 123	\$ 324	\$ 478	\$ 155	5.3%	-3.1%	-20.8%
10	\$ 412	\$ 527	\$ 116	\$ 391	\$ 543	\$ 152	5.2%	-3.0%	-24.1%
15	\$ 651	\$ 765	\$ 115	\$ 671	\$ 826	\$ 155	-3.0%	-7.3%	-25.9%
20	\$ 799	\$ 913	\$ 115	\$ 824	\$ 903	\$ 79	-3.1%	1.1%	45.8%
25	\$ 978	\$ 1,179	\$ 201	\$ 1,028	\$ 1,214	\$ 187	-4.8%	-2.9%	7.8%
30	\$ 1,166	\$ 1,398	\$ 231	\$ 1,236	\$ 1,390	\$ 155	-5.6%	0.5%	49.6%
40	\$ 1,564	\$ 1,813	\$ 249	\$ 1,640	\$ 1,879	\$ 239	-4.6%	-3.5%	4.4%
50	\$ 1,758	\$ 2,031	\$ 273	\$ 1,732	\$ 2,103	\$ 372	1.5%	-3.5%	-26.7%
60	\$ 2,754	\$ 3,184	\$ 431	\$ 2,817	\$ 3,248	\$ 431	-2.3%	-2.0%	0.0%
75	\$ 3,410	\$ 3,964	\$ 554	\$ 3,486	\$ 4,056	\$ 570	-2.2%	-2.3%	-2.9%
100	\$ 4,214	\$ 4,871	\$ 658	\$ 4,304	\$ 4,953	\$ 649	-2.1%	-1.6%	1.3%
125	\$ 5,585	\$ 6,426	\$ 841	\$ 5,779	\$ 6,462	\$ 683	-3.3%	-0.5%	23.1%
150	\$ 6,617	\$ 7,525	\$ 908	\$ 6,774	\$ 7,557	\$ 783	-2.3%	-0.4%	15.9%
200	\$ 8,115	\$ 9,079	\$ 964	\$ 8,313	\$ 9,018	\$ 705	-2.4%	0.7%	36.7%
							<b>-0.9%</b>	<b>-3.8%</b>	<b>-4.3%</b>

Notes:

- (1) Sell price was assumed at 65% of list
- (2) Manufacturers prices have been market share weighted
- (3) Figures were calculated on a current dollar basis. For totals, all HP sizes were averaged without weighting.

<sup>1</sup> U. S. Census Bureau, *Current Industrial Reports: Motors and Generators 1999*. MA335(99)-1.

This section discusses the research findings concerning the two major supply-side actors: manufacturers and dealers/distributors. For each group, we have developed a set of indicators that measure market conditions in regard to the promotion and sale of premium motors. While the 1999 Baseline study gathered a good deal of information on market conditions, the research was not formally structured with these market indicators in mind. For the current study, we consciously set out to define market indicators beforehand and ensure that the research captured the appropriate information. To evaluate the progress of the market, we re-analyzed the raw data from 1999 and reconstructed comparable figures to the extent possible.

### 3.1 OVERVIEW OF MANUFACTURER FINDINGS

Table 3-1 displays the key market indicators identified for manufacturers. These indicators are grouped into the following categories: completeness of product line; promotion, pricing, and market share of premium motors; and third-party standard setting efforts. The recent adoption of a new premium standard by NEMA represents a major step forward for premium-efficient motors. The ‘NEMA Premium’ standard meets CEE levels for 4-pole motors, which account for about 85% of domestic integral motor sales.

**Completeness of Premium Product Line.** In the absence of substantial demand for CEE-qualified motors, manufacturers may be reluctant to incur the costs of retooling production lines. However, all seven manufacturers produce CEE-qualified models in all horsepower categories for EPAct and special purpose models. In addition, 40% and 17% of manufacturers report an increase in the number of premium models over the past year in EPAct and special purpose models, respectively.

**Promotion of Premium Motors.** Without strong demand for the higher-priced premium models, manufacturers have little incentive to invest in promotional efforts. However, one-half of the manufacturers reported an increase in promotional activities with dealers and customers, respectively.



**Table 3-1: Manufacturer Market Indicators**

Category	Market Indicator	1999	2001	Notes
Completeness of Premium Product Line	Percent of manufacturers offering premium motors in all horsepower categories for EAct, special purpose models	n/a	100%, 100%	of 7 mfrs
	Percent of manufacturers reporting increase over past year in number of premium EAct, special purpose models		40%, 17%	of 6 mfrs
Promotion of Premium Motors	Percent of manufacturers reporting increase in promotional activities over past year with dealers, customers		50%, 50%	of 6 mfrs
Pricing of Premium Motors	Percent change in price differential between CEE and EAct models		-4.3%	From Mfr. Catalog Data
Market Share of Premium Motors	Market share of CEE-qualifying motors in New England by HP: 1-5 hp, 6-20 hp 21-50 hp, 51-100 hp 101-200 hp	13%, 38% 58%, 66% 62%	20%, 44% 60%, 68% 65%	4 mfrs in 2001
	Market share of CEE-qualifying motors in New Jersey by HP: 1-5 hp, 6-20 hp 21-50 hp, 51-100 hp 101-200 hp	5%, 24% 34%, 57% 66%	9%, 24% 40%, 53% 58%	4 mfrs in 2001
Third-party Efforts	Response to third-party standard setting and promotional efforts	NEMA Premium standard meets CEE level for 4-pole motors. Motor Decisions Matter campaign rolled out.		

**Pricing of Premium Motors.** The higher cost of premium efficient motors poses a major obstacle to the purchase of premium models by end users. An analysis of manufacturer catalog data found that the average incremental price difference between standard and premium models declined by 4.3% between 1999 and 2001.

**Market Share of Premium Motors.** Low market share for premium efficient motors may discourage manufacturers from investing in their continued development. The analysis of manufacturer-provided sales data found that market share increased in New England for all horsepower categories, particularly those less than 20 HP. In New Jersey, the shift was more evident in the mid-range sizes, from 20 to 100 hp. Note that the 2001 market share data was collected from only 4 manufacturers, of which two were major producers. In addition, the data from one of these two major manufacturers had to be re-interpreted before being integrated with the other figures. Overall, these findings indicate a slight increase in the penetration of CEE motors in the Northeast region.

**Third-party Efforts.** In June of 2001, CEE and NEMA (National Electrical Manufacturers Association) agreed to co-promote a new standard for premium-efficient motors known as “NEMA Premium”. For 4-pole motors, which account for about 85% of domestic integral motor

sales, the NEMA Premium specification meets CEE levels. For some 2-pole and 6-pole motors, CEE standards were lowered to meet the new NEMA levels. This initiative represents a major step towards harmonizing the various premium definitions into a single, consistent label. By spurring demand for premium motors, programs such as MotorUp have played a major role in encouraging manufacturers to adopt a single standard for premium efficient motors.

In addition, the recent roll-out of the national “Motor Decisions Matter” campaign, which promotes life-cycle analyses for motor purchase and repair vs. replacement decisions, is another positive sign. This program is sponsored by NEMA, EASA, CEE, as well as various utilities and government organizations.

### 3.2 DETAILED MANUFACTURER FINDINGS

As part of the research plan we contacted and interviewed seven motor manufacturers to determine their attitude toward energy efficiency and the role it plays in their business strategies. This section summarizes the results of those discussions.

**Motor manufacturers look on premium motor sales as an important part of their marketing program with distributors.** Six of the seven manufacturers interviewed promote premium motors to their distributors as they recognize that they must offer a full line of product including premiums to be perceived as a first class supplier. They also understand that premium motor sales generate higher revenues and profits. Further they state that their distributors appreciate the advantages of premiums and most use premium sales as an opportunity to position themselves with the customer as a value-added supplier. The manufacturers promote premiums primarily through offering specialized collateral sales materials, trade advertising, maintaining web sites, and through onsite training. About half of the manufacturers state that they have increased their effort to promote premiums in the past two years, while half are doing about the same. Premium motors are promoted by the manufacturers for their longer service life as well as energy saving benefits.

**The principal objections to premiums that manufacturers hear from distributors is that it is more expensive to stock the higher-priced, slower-turning premiums.** Distributors complain to manufacturers that premium motors are more expensive to stock because of the higher unit value of the item and the slower rate of turn. Several of the larger manufacturers, such as Baldor, have established warehouses in the Northeast that offer overnight service on many premium items in an effort to alleviate the higher cost of stocking premiums.

**Motor manufacturers look on premium motors as an important part of their marketing program with end-users.** Manufacturers use a mix of conventional industrial product promotional tools— trade shows, trade publication advertising and to some extent energy saving calculation tools. They stated that these efforts have stayed about the same over the past two years.

**Manufacturers state that principal end-user objections to premiums is simply that in many applications the energy savings and other advantages do not justify the additional cost.** They also state that complaints about higher cost have stayed about the same over the last two years. Most of the manufacturers have supply contracts with some of their largest end-user customers and most of these plans specify premiums when justified under contract guidelines.

**Manufacturer awareness of utility sponsored rebate programs is high, and they believe these programs are important to regional marketing programs.** The programs in New England and California are viewed as the strongest. They are split as to the best method of rebate payments – two prefer payment to vendors, two prefer payment directly to customers, and two have no preference. Nearly all view the rebate dollars themselves as the most important element.

**Six of the seven the manufacturers interviewed see little value in the “Energy Star” label for industrial motors.** They see this label as having its primary value in the consumer market place and being ineffective in the industrial sector. Furthermore four manufacturers stated that they believe there are “too many labels now” and an additional one is not needed. However, all recognize that if other manufacturers use the “Energy Star” designation they will have to follow suit.

### 3.3 OVERVIEW OF DEALER/DISTRIBUTOR FINDINGS

Table 3-2 displays the key market indicators identified for dealers and distributors. These indicators are grouped into the following categories: awareness of efficiency standards, trends in repair vs. replacement, and the stocking, promotion, and sales of premium motors. In general, these indicators reveal little movement in dealer practices exhibiting only scattered, inconsistent progress.

**Awareness of efficiency standards.** Dealer familiarity with the CEE efficiency standard is an important precursor to their effective promotion of these motors to customers. In the Baseline study, 63% of dealers were familiar with the CEE standard compared to 70% of the current dealers. This shows a discernible rise in awareness, particularly since the current dealers represent both program participants and non-participants whereas the 1999 study interviewed only program participants.

**Trends in repair vs. replacement of failed motors.** An effective method to accelerate the penetration of premium motors is to replace instead of repair failed motors. Our research found that 62% of dealers reported doing fewer repair jobs compared to two years ago. In addition, our research found that the average horsepower where customers begin to choose rewinds over replacement rose slightly, from 29 HP to 33 HP. Roughly 40% of dealers noted an increase in this breakpoint HP level, suggesting that there is a sustained trend of replacing, instead of rewinding, larger sized motors.

Another important criterion in the repair vs. replace decision is comparing the costs of repairing a failed motor versus purchasing a new motor. On average, when the repair cost is greater than 60% of the cost of a new motor, dealers recommend purchasing a new motor. This figure has remained stable over the past several years. Our current research found that nearly 42% of dealers have used MotorMaster or a similar tool to guide the decision to repair or replace a failed motor. This is over three times the number found in the 1999 study. In general, it appears that dealer rewind practices have noticeably improved over the past several years.

**Table 3-2: Dealer/Distributor Market Indicators**

Category	Market Indicator	1999	2001
Awareness of efficiency standards	Percent of dealers familiar with CEE standard	63%	70%
Trends in repair vs. replacement of failed motors	Percent of dealers reporting decrease in number of rewinds over past two years	n/a**	62%
	Average breakpoint HP level for repairs/rewinds	29 hp	33 hp
	Percent of dealers noting increase in breakpoint HP level over past two years	43%	38%
	Criterion: average cost of repair as % of replacement	60%	60%
	Percent of dealers using MotorMaster or similar tool to frame decision	13%	42%
Stocking of premium motors	Percent of dealers with full lines of premium motors in stock	n/a**	31%
	Percent of dealers reporting increase in stocking of premium motors over past year	30%	20%
	Average percent of sales requiring custom order of EPA Act, premium models	36%, 18%	40%, 40%
	Average percent of time unable to meet customer requirements for premium motors	3%	6%
Promotion of premium motors	Percentage of dealers who use payback or ROI concepts to sell premium efficiency motors in all situations	4%	1%
	Percentage of dealers who promote premium motors in all situations when taking orders, responding to bids	34%, 14%	20%, 8%
Sales of premium motors	Percent of dealers reporting increase in share of premium motor sales over past two years	48%	36%
	Average percent of units sold that meet CEE std. by HP: 1-5 hp, 6-20 hp 21-50 hp, 51-200 hp	36%, 42% 40%, 38%	35%, 48% 54%, 59%

\*\*This question was not asked in the 1999 survey.

Note: Premium motors were defined as “premium efficient as designated by the manufacturer” in the 1999 study; premium motors were defined as meeting CEE standards in the 2001 study.

**Stocking of premium motors.** A failed motor often impacts an end user’s manufacturing process or key maintenance systems. In these situations, a customer may need a motor with a quick turnaround time, therefore dealer stocking of premium motors is a prerequisite to an end user’s consideration of premium models as a viable alternative. Our research found that 31% of current dealers stock the full range of premium motors. In addition, 30% of the 1999 dealers

reported an increase in stocking of premium motors over the past year although only 20% of the 2001 dealers did so.

The time required for the delivery of motors is another important measure of stocking trends because immediate availability is often critical to customers. In 1999, dealers reported having to custom order standard models in 36% of sales events compared to special ordering premium motors in only 18% of situations. In 2001, they report custom ordering about 40% of both standard and premium efficient models. In addition, dealers report that the instances doubled, to 6% of situations, where they were unable to meet customer requirements due to the unavailability of premium motors. This increase in customer ordering and lack of availability for premium models may be partially attributable to the fact that, in 1999, premium models were defined as those designated premium by the manufacturer; in 2001, premium models were defined as those meeting CEE standards. In general, there appears to be little change in dealer stocking practices.

**Promotion of premium motors.** Dealers can have substantial influence over a customer's decision to purchase a premium motor. In 1999, only 4% of dealers reported using payback of return-on-investment analyses in all situations to help sell premium motors. This compares to only 1% of the dealers interviewed for the 2001 study. In addition, dealer promotion of premium motors appears to have declined over the last two years; from 34% to 14% when taking orders and from 20% to 8% when responding to bids. Again, this decline may be partially attributable to the tighter definition of premium motors as CEE qualifying in the 2001 study.

**Sales of premium motors.** Low sales volumes of premium motors discourages dealers from investing in enhanced promotional and sales efforts. However, roughly one-half of the 1999 dealers reported an increase in sales of premium models over the past two years. Thirty-six percent of the current dealers noted such an increase. This suggests that there has been a sustained rise in the sale of premium models over the past few years. In addition, dealers report sales of CEE motors suggest that sales have generally risen. Note that dealers' perceptions of sales figures are often over-stated.

### 3.4 DETAILED DEALER/DISTRIBUTOR FINDINGS

These findings are based on data collected from 100 computer assisted telephone interview (CATI) surveys administered to dealers and distributors in the Northeast region. The surveys were administered during May and June of 2001 by Market Decisions Corporation. The sample was drawn from the MotorUp database provided by Applied Proactive Technologies, which include both initiative participants as well as non-participants. The survey focused on the sales and market conditions for standard, premium efficiency (as rated by manufacturer) and CEE-qualifying motors. The surveys also analyzed the distributors' perception of trends in motor prices, stocking practices, motor repair, promotion strategies, perceptions of customer demand and response to MotorUp.

In order to evaluate the changes in dealer perceptions and practices, this report utilizes data gathered from the 1999 Baseline Study of the Northeastern Electric Motor Market prepared by Easton Consultants. The 1999 dealer research involved in-depth interviews conducted by staff

from Easton and XENERGY. It is important to note that the 1999 interviews targeted motor dealers who participated in the initiative and had rebated a large number of motors. In contrast, the 2001 research interviewed a more random sample of dealers, which should provide a more representative view of the market. This methodological difference should be taken into consideration when interpreting the findings.

The 1999 survey defined premium motors as “designated as premium by the manufacturer.” Because MotorUp provides rebates for motors that meet CEE standards, the 2001 study defined premium motors as meeting “MotorUp or CEE standards”. It is important to consider this difference in the definition of premium motors when interpreting the relevant findings.

### 3.4.1 Profile of Motor Dealers

The 1999 and 2001 surveys were held generally with senior staff from each motor distributor firm. In 2001, 40 percent of respondents indicated that they were the President/CEO/owner of the firm, 13 percent were sales managers and 12 percent were some other type of manager (Table 3-3). In 1999, the respondents were more evenly distributed between sales managers (43 percent), President/CEOs (30 percent) and general managers (28 percent).

**Table 3-3: Respondent Job Title**

	1999	2001
Sales Manager	43%	13%
President/CEO	29%	40%
General Manager	27%	7%
Other Manager	0%	27%
VP/Sales	0%	8%
Other	2%	5%
Observations	47	100

Nearly all the firms surveyed during 1999 and 2001 (96 -100 percent) sell new electric motors to end-user customers and 77-80 percent claimed to sell other kinds of electrical or mechanical equipment (Table 3-4). About half of the firms (52 percent) surveyed in 2001 and 72 percent of those surveyed in 1999 perform motor rewinds and repair. Nearly half (51 percent) of distributors interviewed in 2001 are manufacturer representatives for motor sales, as compared with only 17 percent of firms surveyed in 1999. This discrepancy may be due to differing methods for selecting dealers in 1999 and 2001.

**Table 3-4: Business Activities**

Business Activities	1999	2001
New Electric Motor Sales to End-Use Customers and OEMs	100%	96%
Sales of Other Kinds of Electrical or Mechanical Equipment	77%	80%
Motor Rewinds and Repair	72%	52%
Manufacturers Representative for Motor Sales	17%	51%
Observations	47	100

### 3.4.2 Motor Sales

The distributor firms were asked about what percentage of annual sales revenues came from the sale of new electric motors (Table 3-5). In 2001, 23 percent of their revenues came from sales of new electric motors and the mean number of motors sold was 299 units with a median of 150. Overall, nearly half of these motors were sold direct to facility owners and managers (44 percent). Electrical/mechanical contractors, OEMs and motor dealers each accounted for between 15 and 20 percent of new motors sales.

The distributor firms interviewed for the 1999 baseline study generally sold a much greater number of electric motors. The mean number of units sold, 663, was more than double the number found in the 2001 survey. In addition, the median number of motors sold was 400, giving a further indication of the scale of their motor sales activity. This difference is likely due to the focus in 1999 on larger dealers that rebated a high number of motors through the initiative. On average, the 1999 firms derived 32 percent of their sales revenues through electric motor sales. The majority of their motor sales (60 percent) were made directly to facility owners and managers, with the remainder split evenly between electrical/mechanical contractors and OEM's.

**Table 3-5: Motor Sales**

Percent of Annual Sales Revenues from New Electric Motor Sales	1999	2001
Mean	32%	23%
Median	30%	20%
# Observations	27	97
Number of Electric Motors =>1 HP Sold in 2000		
Mean	663	299
Median	400	150
# Observations	42	86
Percent of Motors* Sold To...		
Direct to Facility Owners and Managers	60%	44%
Electrical and Mechanical Contractors	22%	20%
OEM's	21%	17%
Motor Dealers**	0%	15%
# Observations	32	85

\*Weighted by annual integral motor sales; \*\*Asked only to manufacturers representatives for motor sales (n=40).

The vast majority (70-71 percent) of motors that the distributors sold were general-purpose AC induction motors (Table 3-6). The remaining 30 percent of motors was nearly evenly divided between special-purpose AC induction motors (12-16 percent) or alternative motor designs (14-16 percent).

**Table 3-6: Sales\* of Motors By Type**

Motor Type	1999	2001
General Purpose AC Induction Motors	70%	71%
Definite or Special Purpose AC Induction Motors	16%	12%
DC or Other Types of Motors	14%	16%
# Observations	27	85

\*Weighted by annual integral motor sales



Excluding sales to OEMs, the majority of motors (52%) sold during 2000 fell into the 1-5 horsepower category (Table 3-7). In contrast, motors in the large 51-200 HP category accounted for only 7 percent of overall sales in 2000. These figures are generally in accordance with earlier 1999 baseline figures for the Northeast region, which has fewer large horsepower motors than is the case nationally. Since fewer motor dealers sell larger horsepower motors, there are less observations for the larger hp categories.

**Table 3-7: Sales\* of Motors by Size**

<b>Percent of Annual Integral Horsepower 3-Phase AC Motors Sold, excluding to OEMs</b>	<b>1999</b>	<b>2001</b>
1-5 HP	44%	52%
6-20 HP	29%	22%
21-50 HP	14%	16%
51-200 HP	12%	7%
# Observations	38	58-86

\*Weighted by annual integral motor sales

The distributors were asked how the sales of motors had changed over the previous two years (Table 3-8). In 1999, nearly all dealers, 87%, felt that the market for standard 3-phase motors had remained largely static. In 2001, roughly half of respondents felt that the market for standard 3-phase motors had remained largely stable with the remaining dealers evenly divided on whether sales had increased or decreased (22 percent increased, 27 percent decreased). From the dealer's perspective, the market for motors has remained relatively stable over the last few years.

**Table 3-8: Trends in Motor Sales**

<b>Integral Three-phase Motor Sales Trend Over Past Two Years</b>	<b>1999</b>	<b>2001</b>
Increased	9%	22%
Decreased	4%	27%
Stayed the Same	87%	51%
# Observations	46	100

### ***Sales of Premium Motors***

Dealers from the Baseline study reported that 41% to 54% of motors sold were labeled premium, as defined by the manufacturer (Table 3-9). Generally, a higher proportion of premium sales occur for larger horsepower motors. The current research revealed that between 44% and 61% of motors sold in 2000 were premium models. Sales of premium models appear to have remained fairly stable for motors under 20 hp but rose more noticeably for the larger size motors. According to dealers, sales of MotorUp/CEE motors have slightly increased over the past two years in most HP categories, from 36%-42% to 35%-59%. Note that these sales numbers are estimates provided by dealers and that, in the past, dealers have been found to over-report sales. This may partially explain the discrepancy between these figures and the sales data provided by manufacturers in Section 2.



**Table 3-9: Sales\* of Premium Motors**

<b>% Premium Efficiency**</b>	<b>1999</b>	<b>2001</b>
1-5 HP	41%	44%
6-20 HP	51%	52%
21-50 HP	54%	61%
51-200 HP	49%	60%
# Observations	38	66-99
<b>% MotorUp/CEE</b>		
1-5 HP	36%	35%
6-20 HP	42%	48%
21-50 HP	40%	54%
51-200 HP	38%	59%
# Observations	38	56-84

\*Weighted by annual integral motor sales;

\*\*Manufacturer's definition of Premium, excludes sales to OEMs.

Roughly one-half of the dealers surveyed in both 1999 and 2001 thought that the market for premium motors had remained stable over the past two years (Table 3-10). Most of the remaining dealers thought that sales had increased. In general dealers are split between the belief that the market for premium motors is stable or growing.

**Table 3-10: Trends in Premium\* Motor Sales**

<b>Premium* Motor Sales Trend Over Past Two Years</b>	<b>1999</b>	<b>2001</b>
Increased	48%	36%
Decreased	0%	16%
Stayed the Same	52%	48%
# Observations	46	87

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

The 2001 distributors were asked what factors were most important in contributing to the change in motor sales (Table 3-11). Utility company rebates were deemed most important by 20 percent of the respondents. Other significant factors included greater customer awareness of these products (13%), and promotions or programs by both the motor manufacturers and utility companies (11% each). In 1999, dealers felt that changes in market conditions were driven by dealer promotions, rebates, program awareness, and awareness of the benefits of energy-efficient motors.

**Table 3-11: Factors driving Change in Sales of Premium\* Motors**

<b>Factors</b>	<b>2001</b>
Utility Company Rebates	20%
Greater Customer Awareness	13%
Promotion by Manufacturers	11%
Utility Programs/Promotions	11%
Higher Energy Costs	9%
Lower Price Differential between EPACT and Premium Motors	7%
Greater Availability of Premium Motors	2%
Fuller Product Line for Premium Efficiency Motors	2%
Other	16%
Don't Know	2%
Number of Observations	45

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

### **3.4.3 Motor Pricing**

Table 3-12 reveals that almost three-quarters of dealers believed that wholesale prices of standard and premium motors were stable during 1998-1999 (Table 3-12). In addition, 80% thought that the wholesale price difference between standard and premium motors remained constant.

In contrast, slightly over one-half of the current dealers believe that wholesale prices of both standard and premium motors have risen this past year. Most of the remaining dealers think prices have been stable. Seventy-four percent of the current dealers believe that the wholesale price difference has remained constant. This indicates that, recently, dealers believe that the wholesale price of motors has begun to rise, but that the price difference between standard and premium motors has generally remained stable. Dealer perceptions of prices appear to be in slight contrast to the analysis of manufacturer pricing data presented in Section 2. This analysis found that EPAct prices declined by about 1%, CEE prices fell about 4%, and the price differential declined by approximately 4%.

**Table 3-12: Trends in Motor Prices**

<b>Wholesale Price of Standard Motors Over the Past Year</b>	<b>1999</b>	<b>2001</b>
Increased	14%	52%
Decreased	14%	10%
Stayed the Same	72%	37%
# Observations	43	87
<b>Wholesale Price of Premium* Motors Over the Past Year</b>		
Increased	9%	52%
Decreased	18%	6%
Stayed the Same	73%	43%
# Observations	44	87
<b>Wholesale Price Difference Between Premium* and Standard Motors Over the Past Year</b>		
Increased	9%	22%
Decreased	11%	2%
Stayed the Same	80%	74%
# Observations	44	87

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

According to the 2001 survey results, distributors tend to sell EPAct-qualifying motors at about 54 percent and premium motors at 58 percent of their list price when sold individually (Table 3-13). In large-quantity, competitive-bid situations, distributors can often obtain special prices from manufacturers. When purchased in bulk, EPAct-qualifying motors drop in price to 43 percent of list, and premium motors prices are reduced to 44 percent of list. These results are very similar to available 1999 data in the case of individual sales of EPAct and premium motors.

The data do indicate that volume sale prices did decrease somewhat between 1998 and 2000. EPAct motors dropped from 57 percent to 43 percent of list price and premium motors dropped from 57 percent to 44 percent of list when sold in volume. Note, however, that only 8 dealers responded to this series of questions during the 1999 survey.

**Table 3-13: Motor Pricing Practices**

<b>Percentage of List Price EPA<sup>1</sup> Qualifying Motors Sold Singly</b>	<b>1999</b>	<b>2001</b>
Mean	55%	54%
Median	60%	65%
# Observations	13	63
<b>Percentage of List Price EPA<sup>1</sup> Qualifying Motors Sold In Volume</b>		
Mean	57%	43%
Median	58%	55%
# Observations	8	64
<b>Percentage of List Price Premium* Motors Sold Singly</b>		
Mean	58%	58%
Median	60%	65%
# Observations	13	63
<b>Percentage of List Price Premium* Motors Sold in Volume</b>		
Mean	57%	44%
Median	58%	50%
# Observations	8	63

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

#### **3.4.4 Promotion of Premium Motors**

The lack of effective promotion of premium motors by distributors has been cited as a major barrier to market transformation. To verify this concern, the surveys attempted to analyze dealer promotional practices to gauge dealer enthusiasm for the premium motors.

The 2001 survey data indicate that the vast majority (82 percent) of motor sales are generated by taking orders over the phone or via over the counter orders (Table 3-14). The data reveal that very few motor sales are generated in the region through responding to bid requests (11 percent) and through supply contracts (8 percent). These results are nearly identical to 1999 survey findings.

**Table 3-14: Percent of Sales\* by Type**

<b>Orders Taken Over the Phone/Counter</b>	<b>1999</b>	<b>2001</b>
Mean	82%	82%
Median	83%	90%
# Observations	36	99
<b>Responding to Bid Requests</b>		
Mean	11%	11%
Median	10%	10%
# Observations	35	99
<b>Fulfilling Supply Contracts</b>		
Mean	6%	8%
Median	0%	0%
# Observations	35	97

\*Weighted by annual integral motor sales

The dealers interviewed in 2001 appear to promote premium motors over the phone about as often as those in 1999, as 56% and 64% do so in “most” or “all” situations, respectively (Table 3-15). The 1999 distributors were nearly twice as likely (57% vs. 28%) to include bids for premium motors when submitting bids. Note that bid requests account for only 11% of sales and that bids typically are won with low prices, therefore including bids for premium motors occurs less often.

**Table 3-15: Promotional Practices I**

<b>Inform Customers About Premium* Motors (Over the Phone/Counter)</b>	<b>1999</b>	<b>2001</b>
In all Situations	34%	20%
In Most Situations	30%	36%
In Some Situations	32%	33%
Never	4%	11%
# Observations	47	87
<b>Include Bids for Premium* Motors When Submitting Bids</b>		
In All Situations	14%	8%
In most Situations	43%	20%
In Some Situations	43%	26%
Only if Requested	0%	33%
Never	0%	11%
# Observations	37	87

\* “Premium Efficiency” used in 1999, “MotorUp or CEE qualifying” used in 2001

Some dealers will calculate the energy costs of various motor models in order to select the model that best suits their customers’ needs. This can be an effective promotional technique for premium efficiency motors (Table 3-16). The 2001 survey data show that the dealer sales staff calculates energy costs, including life-cycle costs, of various motor models in all situations only

1% of the time. Only 6% of dealers do so in “most” situations while 55% do so in some situations. The remaining 38% of respondents never calculate energy costs. The data from 1999 showed very similar results. The 2001 distributors, on the other hand, are far more likely (71 percent) to have access to energy-savings calculators like MotorMaster than was previously the case.

**Table 3-16: Promotional Practices II**

<b>How Often Does Sales Staff Calculate the Energy Costs of Alternative Models?</b>	<b>1999</b>	<b>2001</b>
In All Situations	4%	1%
In Most Situations	4%	6%
In Some Situations	51%	55%
Never	40%	38%
# Observations	47	100
<b>Have Energy Savings Calculators, such as MotorMaster</b>		
Yes	52%	71%
# Observations	46	100

### **3.4.5 Stocking Practices**

The distributors interviewed in 2001 typically keep about 70 general-purpose 3-phase motors on hand in their shop at any given time (Table 3-17). This level of stock has remained stable during the past year for 62 percent of respondents. The 2001 dealers also generally observed (67 percent) that stocking patterns of premium motors remained consistent during 2000. Of the remaining 33 percent of respondents, 20 percent thought stocking for premiums had increased and 13 percent felt they had decreased.

The dealers surveyed in 1999 noted similar stocking trends for standard and premium motors although the average number of motors stocked was much larger at 177 units. This is likely due to the focus on large dealers during the 1999 research.

**Table 3-17: Motor Stocking Trends**

<b>Number of General-Purpose 3-Phase Motors On Hand</b>	<b>1999</b>	<b>2001</b>
Mean	177	70
# Observations	25	95
<b>Number of Standard Motors in Stock Compared to 12 Months Ago</b>		
Increased	12%	18%
Decreased	9%	20%
Stayed About the Same	79%	62%
# Observations	34	95
<b>Change in Premium* Motors Stock Compared to 12 Months Ago</b>		
Increased	30%	20%
Decreased	0%	13%
Stayed About the Same	70%	67%
# Observations	34	82

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

Dealer stocking patterns of the various sized motors have largely remained the same over the past two years (Table 3-18).

**Table 3-18: Percent of Motors Stocked\* by Size**

<b>Standard 3-Phase Integral Motors</b>	<b>1999</b>	<b>2001</b>
1-5 HP	44%	49%
6-20 HP	26%	24%
21-50 HP	14%	18%
51-200 HP	6%	5%
# Observations	25-28	86-90

\*Weighted by number of integral motors in stock

Dealer stocking of premium efficient motors appears to have remained fairly stable over the past several years. Stocking of 1-5 hp premium motors seems to have slightly increased while stocking for larger-sized motors appears to have declined (Table 3-19). Roughly 40% to 50% of motors stocked by dealers are MotorUp/CEE qualified. Note that these stocking numbers are self-reported estimates provided by dealers and that, in the past, they have been found to over-report figures.

**Table 3-19: Percent Premium Motors Stocked\* by Size**

<b>% Premium** Efficiency</b>	<b>1999</b>	<b>2001</b>
1-5 HP	44%	48%
6-20 HP	62%	55%
12-50 HP	81%	67%
51-200 HP	81%	72%
# Observations	28-47	33-86
<b>% MotorUp/CEE</b>		
1-5 HP	n/a	38%
6-20 HP	n/a	46%
21-50 HP	n/a	50%
51-200 HP	n/a	50%
# Observations	n/a	32-74

\*Weighted by number of integral motors in stock ; \*\*Manufacturer's definition of Premium.

As shown in Table 3-20, the most important factors that contributed to a change in the stocking of premium efficiency motors were customer demand (33 percent), the state of the economy (15 percent) and rebates offered by utility companies (15 percent). The 1999 survey found that dealer promotion of premium motors was very important, followed by the rebates.

**Table 3-20: Drivers of Changes in the Stocking of Premium\* Motors**

<b>Factors</b>	<b>2001</b>
Customer Demand	33%
Economy	15%
Utility Company Rebates	15%
Energy Savings	7%
Programs/Promotion by Utility Companies	7%
Fuller Product Line for Premium Efficiency Motors	4%
Other	37%
# Observations	27

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001



### ***Custom Order and Delivery Trends***

During the past 12 months dealers had to custom order both standard and premium efficiency motors about 40 percent of the time as opposed to pulling models from their inventory (Table 3-21). The 1999 dealers custom ordered standard motors about as often (36 percent), but were less likely to custom order premium motors (18 percent). The distributors claimed that they were unable to deliver a premium efficiency motor to meet customer needs about 6 percent of the time, which is double the figure found in the 1999 Baseline study.

**Table 3-21: Custom Order and Delivery Trends**

<b>% Standard Motors Custom Ordered*</b>	<b>1999</b>	<b>2001</b>
Mean	36%	40%
# Observations	26	82
<b>% Premium** Motors Custom Ordered*</b>		
Mean	18%	40%
# Observations	27	75
<b>% of Time Unable to Deliver Premium Motor to Meet Customers' Demands</b>		
Mean	3%	6%
# Observations	38	85

\*Weighted by annual integral motor sales;

\*\*"Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

### ***3.4.6 Rewind and Repair Business***

The 52 vendors who reported doing rewinds claimed that they recommended new motors in nearly all situations (96 percent) when customers brought in failed units. This finding is nearly identical to the claims of all 30 dealers from the 1999 survey. Sixty-two percent of dealers report that, over the past two years, they are rewinding less motors and another 25% indicate the amount of rewinds had remained stable (Table 3-22). Only 12% noted an increase in the frequency of rewinds.

**Table 3-22: Trends in Repair and Rewind**

<b>Number of Motors Repaired Compared to 2 Years Ago</b>	<b>2001</b>
More	12%
Less	62%
Same	25%
# Observations	52

The distributors cited many reasons why the purchase of a new motor is recommended. One-half of the 2001 dealers suggested motor replacement when the rewind cost is greater than a certain percent of the cost of a new motor; the average estimate was 60 percent (Table 3-23). In

addition, another 26% said they recommend replacement when a repair job costs more than a replacement job. Twenty percent suggested replacement when the old motor falls below a certain horsepower; the average size was 33 hp. Other concerns that were important to distributors included the need for additional motor repairs (16 percent) and the age of the motor (12 percent). Almost two-thirds of the 1999 dealers suggested replacement when the old motor fell below a certain size; an average of 35 HP. Nearly 40 percent recommended replacement if there were other motor repairs required.

**Table 3-23: Conditions Under which Purchase of New Motor Recommended**

	1999	2001
Rewind Cost is Greater than Certain Percent of New Motor Cost (Specify %)	56% (60%)	50% (60%)
Motor Falls Below Certain Horsepower (Specify HP)	66% (35hp)	20% (33hp)
Other Repairs Required	38%	16%
Motor is of Common design, base, mounting	25%	0%
Motor Has Been Rewound before	19%	2%
Motor is Older Than a Certain Age	0%	12%
When repairs cost more	0%	26%
Other	3%	6%
Don't Know/No Answer	0%	2%
Observations	32	50

According to the 2001 dealers, the average breakpoint horsepower to choose repairs/rewinds over replacements is 33 hp; the median is 30 hp (Table 3-24). According to about 60 percent of the vendors, this breakpoint horsepower figure has remained about the same for the past two years. Thirty-eight percent of vendors claimed that this breakpoint horsepower figure had increased during that time. Similar results were found in the 1999 Baseline Study, as the average breakpoint HP level was found to be 29 hp with a median of 30 hp. The 1999 dealers were divided pretty evenly on whether the average breakpoint horsepower had remained the same (48 percent) or had increased (43 percent).

**Table 3-24: Breakpoint Horsepower Level**

<b>Breakpoint HP Level When Choosing Repairs Over Replacement</b>	1999	2001
Mean	29	33
Median	30	30
# Observations	32	43
<b>Change in Breakpoint HP Level Over the Past Two Years</b>		
Up	43%	38%
Down	9%	2%
About the Same	48%	58%
# Observations	23	52

Forty-two percent of the 52 distributors interviewed for the 2001 study claimed that they have used MotorMaster or a similar tool to compare the life-cycle costs of repairs versus replacements. This represents a threefold increase over distributors interviewed for the 1999 study, where only 13% of dealers reported using MotorMaster.

### 3.4.7 Perceptions of Customer Demand

The 1999 and 2001 distributor surveys probed dealers about the purchasing decisions of their customers. According to the 2001 survey results, about 26 percent of customers have a specific policy concerning the efficiency of electric motors purchased, which is substantially more than the figure of 17 percent found in the 1999 study (Table 3-25). Overall, an average of 44 percent of those customers with motor purchase policies specify premium efficiency motors. The 2001 survey data also note that only 13 percent of customers apply life-cycle costing principles to the purchase of electric motors, which is substantially less than the 1999 figure of 39 percent.

**Table 3-25: Customer Purchase Policies**

<b>% Customers with Motor Efficiency Purchase Policy</b>	<b>1999</b>	<b>2001</b>
Mean	17%	26%
Median	10%	13%
# Observations	45	94
<b>% Customers with Motor Purchase Policy Specifying Premium Motors</b>		
Mean	n/a	44%
Median		30%
# Observation		69
<b>% Customers That Apply Life-Cycle Costing Principles</b>		
Mean	39%	13%
Median	25%	5%
# Observations	38	51

This section discusses the research findings concerning the demand side of the electric motor market. We have developed a set of indicators that measure market conditions in regard to the penetration of premium motors. While the 1999 Baseline study gathered a good deal of information on market conditions, the research was not formally structured with these market indicators in mind. For the current study, we consciously set out to define market indicators beforehand and ensure that the research captured the appropriate information. To evaluate the progress of the market, we re-analyzed the raw data from 1999 and reconstructed comparable figures to the extent possible.

#### **4.1 OVERVIEW OF END USER FINDINGS**

Table 4-1 displays the key market indicators identified for end users. These indicators are grouped into the following categories: awareness of efficiency standards, decision-making structure regarding motor purchases and failed motors, and perceptions of premium motors.

**Awareness of efficiency standards.** As a precursor to the purchase of premium motors, end users must first be familiar with the efficiency designations. Therefore end users were asked to identify the various motor efficiency standards they were familiar with. In 1999, 34% of end users cited the “premium” designation while none mentioned the CEE standard. Similar results were found in 2001 as 27% mentioned the “premium” designation and 1% mentioned CEE standards. When directly probed, 28% of end users reported being familiar with the CEE standard. These results indicate that while the term premium efficiency has begun to penetrate with end users the CEE standard has achieved little success.

**Decision-making structure for motor purchases.** An important barrier to the further adoption of premium motors is the lack of an established framework for guiding motor purchase decisions. In 1999, the research found that 31% of end users had some type of motor purchasing policy or procedure, with 5% using a written format and 18% applying efficiency standards to all relevant motors. In 2001, 39% of end users were found to have some type of policy or procedure, 11% used written specifications, and 10% applied efficiency standards to all relevant motors. These findings suggest that motor purchasing policies have become slightly more common over the past two years but that their substance has changed little.

The use of decision-support tools are also important indicators of a well-developed decision structure. In 1999, 19% of customers reported always comparing energy usage between different models before purchasing a new motor. In addition, 11% of end users were aware of the MotorMaster program although only 1% used it in most situations. In comparison, 14% of the current end users analyze energy usage, 16% are aware of MotorMaster although still only 1% use it regularly. Little change is evident in the use of tools to guide the selection of new motors.

A comparison of self-reported purchases of CEE motors reveals a downward trend. However, these figures should be viewed in the context that end users have a generally poor understanding of efficiency standards therefore their self-reported purchase figures are questionable, at best.

Table 4-1: End User Market Indicators

Category	Market Indicator	1999	2001 Industrial*	Notes
Awareness of efficiency standards	Percent of customers aware of “premium” & CEE efficiency standards	34%, 0%	27%, 1%	unprompted
	Percent familiar with CEE standard	n/a	28%	prompted
Decision-making structure for motor purchases	Percent of customers with a policy or procedure to guide the selection of motors	31%	39%	
	Percent of customers with written specifications	5%	11%	
	Percent of customers with policy that specifies premium for all motors with eff. stds.	18%	10%	
	Percent of customers who, in all situations, report making comparison of energy usage between models	19%	14%	
	Percent of customers aware of MotorMaster software, use MotorMaster to guide the selection of motors in most situations	11%, 1%	16%, 1%	
	Percent of motors purchased over past year that met MotorUp/CEE standards	71%	58%	Of those aware of MotorUp/ CEE std.
Decision-making structure regarding the repair vs. replacement of failed motors	Percentage of customers with policy to guide the decision to repair or replace failed motors	n/a**	38%	
	Criterion: percent of customers citing operating costs or ROI as most important factor in decision	12%	27%	
	Average percent of motors repaired in HP categories.			
	1-5 hp, 6-20 hp 21-100 hp, 101-200 hp	12%, 19% 67%, 77%	9%, 35% 66%, 74%	
Perceptions of the availability and performance of premium motors	Percent of customers reporting purchase of standard models over past year due to lack of immediate availability of premium models	25%	33%	
	Average number of times over past year	4	7	
	Percent of customers reporting longer wait period for premium motor	20%	29%	
	Average waiting period over past year (number of days)	6	8	
	Percent of customers citing advantages of premium motors other than reduced electricity usage, disadvantages other than higher cost	49%, 17%	42%, 9%	

\*The 1999 study interviewed solely industrial customers. Therefore to measure market progress in a valid manner requires comparison to just the industrial segment from the 2001 study, which also included commercial customers.

\*\*This question was not asked in the 1999 survey.

Note: Premium motors were defined as “premium efficient as designated by the manufacturer” in the 1999 study; premium motors were defined as meeting MotorUp or CEE standards in the 2001 study.

**Decision-making structure regarding the repair vs. replacement of failed motors.** In the case of failed motors, the absence of an established framework to guide the decision to replace or rewind can discourage the purchase of premium motors. The research found that 38% of current end users have a policy to guide the decision to repair or replace. The number of customers citing operating costs or ROI as their primary decision criteria more than doubled from 12% to 27%. However, over one-half still cite the capital cost as the main criteria and another 15%-20% cite availability or turnaround time. The percent of motors rewound by horsepower category appears to have remained relatively stable over the past several years, with the exception of an unusual increase in rewinding in the 6-20 HP range.

**Perceptions of the availability and performance of premium motors.** Because dealers have historically not stocked a full line of premium motors, some end users have encountered problems getting premium motors quickly. The 1999 study found that, over the past year, 25% of end users had to purchase a standard efficiency model because a premium model was not available in time to meet their needs. This occurred an average of 4 times for each respondent. In addition, 20% noted a longer waiting period for premium motors, an average of 6 days longer. In 2001, 33% of customers reported encountering these problems, an average of 7 times each; 29% reported a longer waiting period, an average of 8 days each. End users appear to perceive little change in the availability of premium motors.

Past technical problems with premium motors has sometimes led to a poor perception of performance. Forty-nine percent of 1999 end users and 42% of 2001 end users noted advantages to premium motors, besides lower electricity costs. In addition, only 17% and 9% noted any disadvantages with premium motors besides their higher cost. The perceptions of the performance of premium motors does not appear to have changed over the past several years.

## 4.2 DETAILED END USER FINDINGS

The purpose of this section is to analyze results from the 2001 end-user survey component of the MotorUp Market Transformation Assessment and Evaluation. The survey had a number of goals, including to:

- assess decision-making tactics for motor selection;
- gather information on motor rewinding practices;
- determine market share of premium-efficiency motors; and
- gauge end-user response to MotorUp.

The data yielded by the 2001 surveys is compared to figures from a previous baseline study prepared by Easton Consultants and XENERGY in 1999. This comparison will illuminate trends in the high-efficiency motor market since the baseline study was conducted and analyze the effectiveness of MotorUp among end-users. In 1999, only industrial end users

were interviewed. Therefore results from only the industrial sector of the 2001 study are compared to the 1999 findings. The industrial sector consists of all facilities with the exception of hospital, office, retail, and lodging establishments.

### **4.2.1 Research Plan**

The sample for the 2001 end-user sample is similar to the sample for the 1999 surveys with the added dimension of commercial (rather than just industrial) end-users in the sample. While the 1999 sample was drawn from sponsoring utilities' customer information databases, the sample for the 2001 survey was drawn from Dun & Bradstreet's IMarket Database. The sample size for the MotorUp area was set at 220, divided evenly between New Jersey and the remainder of the region. There were minor variations in the sample to take into account regional differences in motor energy consumption.

The 1999 survey defined premium motors as "designated as premium by the manufacturer." Because MotorUp provides rebates for motors that meet CEE standards, the 2001 study defined premium motors as meeting "MotorUp or CEE standards". It is important to consider this difference in the definition of premium motors when interpreting the relevant findings.

### **Sample Segmentation**

**Segmentation by Standard Industrial Classification code.** As in the 1999 study, the industrial portions of the sample were segmented by SIC code. Because commercial customers account for a substantial portion of initiative participants, sponsors requested that commercial customers be represented in the sample. An analysis of the initiative database determined that office, retail, education, hospital, municipal government, and lodging establishments should be included in the sample.

**Segmentation by Business Size.** The same size segmentation scheme was applied to this sample as in the 1999 study. The two size categories are 100 to 499 and 500+ employees. Establishments with fewer than 100 employees are not included in the sample frame as they account for a relatively small portion of motor system energy and sales.

### **Sample Allocation**

Estimates of motor system energy use were employed as a proxy for overall motor purchases. These estimates were developed using the procedures outlined below. Motor system energy use by SIC sector is detailed by region in Table 4-1.

**Industrial SICs.** Results of the *United States Industrial Electric Motor Market Opportunities Assessment* were used to estimate motor system energy use per employee by 2-digit SIC and facility size category. This process was also employed to estimate energy usage for municipal water and wastewater systems.



**Commercial Building Types.** Estimated energy use per employee in commercial building types was estimated using data from the Commercial Building Energy Consumption Survey and a recent analysis of motor system use in commercial buildings conducted for the U. S. Department of Energy.

**Table 4-2**  
**Percentage of Total Motor Energy Use\* by Sector and Region**

Sector	SIC Codes	% Total Motor Energy	
		New England + LIPA	NJ
Chemicals	28	26.9%	65.4%
Paper	26	17.3%	6.3%
Hospital	80	11.4%	6.3%
Office	60, 61, 62, 63, 64, 65, 67, 81, 83, 87, 91, 93, 94, 95, 96	8.5%	5.6%
Petroleum	29	0.6%	8.0%
Primary Metals	33	5.1%	1.7%
Food	20	2.9%	2.9%
Transport Equipment	37	4.1%	0.5%
Retail	52, 53, 56, 57, 59	2.5%	1.8%
Electronic Equipment	36	3.1%	-
Rubber	30	2.9%	-
Industrial Machinery	35	2.5%	-
Instruments	38	2.3%	-
Lodging	70	0.5%	1.2%
Miscellaneous Industrial	All remaining Industrial SICs	9.3%	-
Education	82	0.3%	0.2%
<b>Total</b>		100%	100%

\*Excluding Water/Wastewater

**Other Sample Allocation Rules.** Based on experience in the previous market assessment project and examination of the estimates of motor system energy use described above, it was neither feasible nor desirable to allocate the sample among cells strictly on the basis of their motor system energy. The following additional sample allocation rules were therefore implemented:

*Allocation to the Water Supply and Wastewater Treatment Segment.* Water supply and wastewater treatment facilities account for very large portions of total motor system energy, ranging from 30 to 60 percent in the MotorUp area. The range of applications in these facilities is fairly limited (pumps, blowers and compressors) and many special purpose configurations,

such as vertical shaft motors are used. The absolute number of sample points allocated to water and wastewater was therefore limited to 10 per region.

*Allocation to Non-Water Segments.* Sample was allocated to the remaining target SICs or commercial building groups in proportion to the share of total motor system energy they represented, after subtracting the motor system energy attributable to water and wastewater facilities from the denominator.

*Maximum Percentage of Available Establishments.* In New Jersey especially, large chemical plants account for a very significant portion of total industrial motor system energy use. If sample were allocated solely on the basis of motor system energy, completed interviews with one-half to two-thirds of these large plants would be necessary to meet sample quotas. Based on the response rates achieved by the previous study and similar more recent efforts, such a high completion rate was not feasible. Sample allocation was therefore limited to no more than 15 per SIC category.

### ***Number of Targeted and Completed Surveys***

While there were 228 total completed surveys (as compared to a target of 223), it was not possible to reach targets within every sector, region, and business size category when administering the surveys. This was especially true for the larger industrial organizations where a high proportion of establishments were targeted for surveys. Table 4-3 lists the number of targeted and completed surveys within each sector and business size category across the Northeast territory.

**Table 4-3**  
**Number of Targeted and Completed Surveys by Sector and Business Size**

<b>Sector</b>	<b>Target</b>		<b>Actual</b>	
	<b>Small</b>	<b>Large</b>	<b>Small</b>	<b>Large</b>
Hospital	10	20	11	25
Office	10	15	11	18
Retail	6	2	7	2
Lodging	2	2	2	2
Food	9	9	14	4
Paper	25	5	32	4
Chemicals	9	21	22	10
Petroleum	5	3	5	2
Rubber	2	1	2	1
Primary Metals	14	4	14	3
Industrial Machinery	1	1	1	1
Electronic Equipment	2	2	2	2
Transport Equipment	2	7	3	3
Instruments	1	2	2	2
Water / Wastewater	18	2	9	1
Miscellaneous Industrial	10	1	9	2
<b>Total</b>	<b>126</b>	<b>97</b>	<b>146</b>	<b>82</b>

### 4.2.2 Respondent Characteristics

Approximately half of industrial end-users in the 2001 surveys served as Maintenance Managers or Engineers at their facilities, approximately the same proportion as in the 1999 study (Table 4-4). Respondents holding these job titles accounted for a slightly lower proportion of commercial end-users in the 2001 study. Respondents also commonly held managerial positions.

**Table 4-4**  
**Respondents' Job Titles**

Job Title	1999	2001		
		Industrial	Commercial	Overall
Maintenance Manager	35%	40%	22%	34%
Engineer / Plant Engineer	21%	17%	22%	19%
Facilities / Manufacturing / General Manager	4%	13%	20%	15%
Plant / Purchasing Manager	20%	9%	18%	12%
Electrician / Electrical Foreman	12%	10%	9%	10%
HVAC Supervisor / Mechanic	-	2%	8%	4%
Building Superintendent, Director	-	1%	5%	3%
President / CEO	3%	1%	-	1%
Other	4%	6%	5%	6%
Number of Observations	204	150	78	228

While respondents' titles may vary somewhat, their responsibilities at their respective facilities are similar (Table 4-5). The survey instruments in both 1999 and 2001 screened out potential respondents who were not key players in selecting replacement motors or in the decision to rewind or replace failed motors. Respondents were asked if they played major roles in the selection of motors to install in new equipment and (in the 2001 survey) decisions regarding maintenance of equipment containing motors. Not surprisingly, the majority of respondents played key roles in each of these types of decisions.

**Table 4-5**  
**Respondents' Roles in Motor-Related Decisions**

Decision	1999 Industrial	2001		
		Industrial	Commercial	Overall
Selection of motors to replace failed equipment	98%	99%	95%	97%
Decision to replace or rewind failed motors	96%	96%	97%	96%
Selection of motors to install in new equipment	87%	86%	85%	86%
Maintenance of equipment containing motors	n/a	97%	97%	97%
Number of Observations	204	78	150	228

### 4.2.3 Knowledge of Efficiency Standards

In both the 1999 and 2001 studies, survey respondents were asked to identify terms used by their motor vendors to designate motor efficiency (Table 4-6). Terms other than “high efficiency” or “energy efficient” were unprompted. Respondents identified “high efficiency,” “premium efficiency,” and “energy efficient” as motor efficiency terms used by their vendors. Recognition of “premium efficiency” seems to have declined slightly from the 1999 survey, while few respondents continue to mention CEE standards.

**Table 4-6**  
**Motor Vendors’ Terms for Designating Motor Efficiency**

Efficiency Designation	1999	2001		
		Industrial	Commercial	Overall
High Efficiency	46%	42%	46%	43%
Premium or Premium Efficiency	34%	27%	12%	22%
Energy Efficient	41%	17%	26%	20%
NEMA Standard	4%	13%	10%	12%
EPAct Standard	1%	7%	4%	6%
Super / Maximum Efficiency	4%	2%	4%	3%
CEE Standard	-	1%	1%	1%
DOE Standard	1%	1%	1%	1%
No Designation	-	1%	1%	1%
Other	9%	3%	3%	3%
Don't Know	-	13%	23%	17%
Number of Observations	159	150	78	228

When asked to identify the types of motors to which these standards apply, the majority of respondents (nearly three-quarters overall) indicated their belief that all electric motors were covered by the efficiency designations identified in Table 4-6. Further detail is provided in Table 4-7.

**Table 4-7**  
**Types of Motors Covered by Efficiency Designations**

Motor Type	1999	2001		
		Industrial	Commercial	Overall
All electric motors	61%	79%	63%	74%
AC (NEMA Design B or squirrel cage) motors (1-200 HP)	3%	2%	2%	2%
AC (NEMA Design B or squirrel cage) motors (>1 HP)	2%	2%	2%	2%
AC (NEMA Design A) motors (1-200 HP)	4%	2%	2%	2%
Three-phase motors	7%	2%	0%	2%
AC (NEMA Design B or squirrel cage) motors	15%	2%	0%	1%
Other	3%	2%	8%	4%
Don't Know	-	8%	23%	13%
Number of Observations	137	130	60	190

Among year 2000 respondents who identified NEMA design B or squirrel cage motors as those covered by efficiency designations, motor dealers or distributors were the most commonly identified source of information about energy efficiency (Table 4-8). In the 1999 survey, dealers and distributors were mentioned as frequently as utility customer representatives.

**Table 4-8**  
**Source of Awareness of Premium Efficiency Motors**

	1999	2001		
		Industrial	Commercial	Overall
Dealer or distributor	35%	55%	33%	51%
Colleague or competitor, word of mouth	-	33%	11%	29%
Print advertisement	-	33%	0%	27%
Utility customer representative	35%	18%	22%	18%
Trade press	14%	8%	11%	8%
Motor manufacturer	8%	8%	11%	8%
Contractor	-	8%	0%	6%
Bill stuffers or direct mail from the utility	8%	3%	11%	4%
Other	-	3%	22%	6%
Number of Observations	51	40	9	49

Overall, 24 percent of 2001 survey respondents indicated familiarity with CEE standards, including 28 percent of industrial respondents as compared to 15 percent of commercial

respondents (Table 4-9). One possible reason for this slight discrepancy may be that CEE's Motor Systems Initiative is aimed primarily toward industrial end-users.

**Table 4-9**  
**Familiarity with CEE Motor Efficiency Standards**

Familiarity	2001		
	Industrial	Commercial	Overall
Familiar with CEE Standards	28%	15%	24%
Not familiar with CEE Standards	72%	85%	76%
Number of Observations	150	78	228

#### 4.2.4 End-User Motor Inventory and Applications

The mean number of total motors per facility for industrial end-users in 2001 is more than 3 times the 1999 mean (Table 4-10). This difference likely results from the possibility that a few firms employing large numbers of motors were included in the 2001 survey. Respondents in the commercial end-user category (2001) had fewer than half as many motors as those in the industrial category. The distribution of motors by horsepower appears to have remained fairly consistent over the past several years.

**Table 4-10**  
**Motors In Use by Size Category\***

Motor Characteristics and Size	1999	2001		
		Industrial	Commercial	Overall
Mean Number of Motors Per Facility	163	500	210	401
Median Number of Motors Per Facility	62	150	63	100
<i>Number of Observations</i>	<i>200</i>	<i>150</i>	<i>78</i>	<i>228</i>
1 – 5 HP	38%	35%	36%	35%
6 – 20 HP	26%	44%	35%	41%
21 – 100 HP	25%	15%	21%	17%
101 – 200 HP	6%	6%	7%	6%
Number of Observations	197 – 198	145 - 149	75 - 78	-

\*Weighted by Number of Motors In Use in Facility

Respondents to the 2001 survey indicated that approximately one-third of all motors in the 1 to 5 and 6 to 20 horsepower ranges have premium efficiency designations. For larger motor sizes (21 to 100 and greater than 101 horsepower), nearly half of all industrial end-use motors are premium-efficiency as compared to approximately one-fourth in commercial end-uses. These results are detailed in Table 4-11.

**Table 4-11**  
**Percentage of Premium Efficiency^ Motors in Use by Size Category\***

Size	1999	2001		
		Industrial	Commercial	Overall
1 – 5 HP	40%	31%	29%	31%
6 – 20 HP		30%	34%	31%
21 – 100 HP		46%	24%	39%
101 – 200 HP		47%	25%	40%
Number of Observations	171	61 – 112	15 - 58	-

^Manufacturer's definition of premium; \*Weighted by Number of Motors In Use in Facility.

Respondents reported similar proportions of motors meeting MotorUp and CEE standards in 2001 (Table 4-12). Note that these figures are self-reported estimates that may be affected by end users lack of familiarity with efficiency standards.

**Table 4-12**  
**Percentage of Motors in Use meeting MotorUp/CEE Standards by Size Category\***

Size	2001		
	Industrial	Commercial	Overall
1 – 5 HP	25%	24%	25%
6 – 20 HP	46%	30%	41%
21 – 100 HP	46%	39%	43%
101 – 200 HP	53%	27%	45%
Number of Observations	7 – 16	27 – 38	-

\*Weighted by Number of Motors In Use in Facility



### Motor Applications

Industrial end-users indicated that approximately three quarters of their motors are used in production processes. Understandably, this percentage is much smaller (11 percent) for commercial respondents in 2001. Facility heating, ventilating, and air conditioning accounted for the most motors used in commercial buildings (44%). See Table 4-13 for further details.

**Table 4-13**  
**Percentage of Motors In Use by Application\***

Application	1999	2001		
		Industrial	Commercial	Overall
Production processes	75%	73%	11%	52%
Facility HVAC	n/a	17%	44%	26%
General services (elevators, etc.)	n/a	8%	15%	10%
Refrigeration	n/a	5%	16%	9%
<i>Number of Observations</i>	199	144 – 150	78	-

\*Weighted by Number of Motors In Use in Facility

### 4.2.5 Motor Purchasing Practices

The mean number of motors purchased by industrial facilities over the past 12 months is more than three times the figure found in 1999 (Table 4-14). Again, the 2001 figure is likely skewed by the inclusion of a few very large facilities in the sample. For 2001 respondents, reasons for industrial motor purchases were split evenly between replacements for failed equipment and to drive newly installed equipment (39 percent), with a smaller portion being placed into stock for later use. A larger proportion of commercial motor purchases were for replacement purposes.

**Table 4-14**  
**Reasons for Motor Purchases\***

Reason for Purchase	1999	2001		
		Industrial	Commercial	Overall
Mean Number of Motors Purchased Per Facility in Past 12 Months	15	50	14	38
Median Number of Motors Purchased Per Facility in Past 12 Months	6	15	6	12
<i>Number of Observations</i>	201	78	148	226
To replace failed equipment	n/a	39%	69%	48%
To drive newly installed equipment	27%	39%	26%	35%
To place into stock for later use	13%	22%	5%	17%
<i>Number of Observations</i>	176	143	66	-

\*Weighted by Number of Motors Purchased by Facility in Past 12 Months

Table 4-15 and Table 4-16 show the percentages of premium efficiency and MotorUp/CEE motor purchased by end users in the year prior to the survey. In general, customers appear to substantially overestimate the purchase of premium motors. Because these figures are self-reported estimates that are likely affected by end users lack of familiarity with the efficiency standards. These findings do not appear to exhibit any noticeable trends.

**Table 4-15**  
**Percentage of Premium Efficiency^ Purchased Motors by Size Category\***

Size	1999	2001		
		Industrial	Commercial	Overall
1 – 5 HP	81%	78%	68%	76%
6 – 20 HP		88%	75%	86%
21 – 100 HP		80%	73%	79%
101 – 200 HP		67%	72%	78%
Number of Observations	160	58 – 109	13 – 54	-

^Manufacturer's definition of premium; \*Weighted by Number of Motors Purchased by Facility in Past 12 Months

**Table 4-16**  
**Percentage of Motors Purchased meeting MotorUp/CEE Standards by Size Category\***

	1999	2001		
		Industrial	Commercial	Overall
1 – 5 HP	71%	53%	72%	54%
6 – 20 HP		47%	48%	47%
21 – 100 HP		79%	64%	78%
101 – 200 HP		64%	74%	65%
Number of Observations	84	30 – 41	6 – 17	-

\*Weighted by Number of Motors Purchased by Facility in Past 12 Months

### ***Motor Supply Contracts***

In the 2001 survey a slightly higher percentage of respondents in the industrial end-user category indicated that they had exclusive motor supply contracts with motor distributors or manufacturers. Overall, a slightly higher proportion of commercial end-users indicated that they had motor supply contracts. A much higher proportion (70 percent) of commercial end-users indicated that motor efficiency ratings were specified in their contracts than industrial end-users (43 percent). Note the low number of observation for these questions though (Table 4-17).

**Table 4-17**  
**Motor Supply Contracts and Details**

Contract Specifications	1999	2001		
		Industrial	Commercial	Overall
Have an exclusive motor supply contract with a distributor / manufacturer	4%	9%	12%	10%
<i>Number of observations</i>	<i>202</i>	<i>150</i>	<i>78</i>	<i>228</i>
Efficiency ratings specified in contract	43%	43%	70%	54%
<i>Number of observations</i>	<i>7</i>	<i>14</i>	<i>10</i>	<i>24</i>

Respondents indicated that their company's purchasing departments were most often responsible for developing these motor supply contracts (Table 4-18).

**Table 4-18**  
**Responsibility for Developing Motor Supply Contract**

Title	2001		
	Industrial	Commercial	Overall
Purchasing Department	46%	33%	41%
Chief Engineer	31%	0%	18%
Don't Know	8%	11%	9%
Facilities Manager	8%	11%	9%
Maintenance Manager	8%	11%	9%
The respondent	15%	0%	9%
CFO or other financial staff	0%	11%	5%
Corporate, general	0%	11%	5%
Energy Manager	0%	11%	5%
Plant Engineer	8%	0%	5%
Other	0%	22%	9%
Number of Respondents	13	9	22

### ***Motor Selection Policy***

Among industrial end-users, a slightly higher proportion indicated that their firms had policies or procedures to guide motor selection in the 2001 survey (Table 4-19). Commercial end-users were less likely to have these policies though. In 2001, 28% of industrial users with a policy used formal written specifications compared to 17% of respondents from the 1999 survey.

**Table 4-19**  
**Motor Selection Policy Details**

Policy Details	1999	2001		
		Industrial	Commercial	Overall
Have a policy or procedure to guide motor selection	31%	39%	20%	33%
<i>Number of observations</i>	<i>194</i>	<i>137</i>	<i>69</i>	<i>206</i>
Policy is a formal set of written rules or specifications	17%	28%	7%	24%
Policy is an informal set of guidelines used by a number of people	38%	26%	50%	31%
Policy is my own informal set of guidelines	35%	19%	14%	18%
Policy is some combination of the above	8%	26%	29%	27%
Number of Observations	60	53	14	67

Among 1999 respondents who indicated having a policy or procedure to guide motor selection, approximately 57 percent indicate that this policy included efficiency standards for all motors to which efficiency standards apply. This figure is approximately 12 percent lower among industrial end-user respondents in 2001. Additional detail is provided in Table 4-20.

**Table 4-20**  
**Efficiency Specifications in Motor Purchase Policy**

Policy Details	1999	2001		
		Industrial	Commercial	Overall
Policy or procedure to guide motor selection?				
Yes	31%	39%	20%	33%
Number of observations	194	137	69	206
Premium* is required... (if company has a policy in place)				
For all motors to which efficiency standards apply	57%	45%	44%	45%
For motors in some horsepower categories	5%	16%	22%	18%
For some motors which meet certain criteria (operating hours, critical applications)	23%	10%	22%	13%
If cost or other financial criteria are met	7%	16%	0%	13%
Motors must meet minimum government efficiency standards	8%	13%	11%	13%
Number of Observations	60	31	9	40

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

### ***Decision-Making***

Survey respondents indicated that managers and engineers in their firms are the individuals with the greatest influence on motor purchase decisions (Table 4-21).

**Table 4-21**  
**Influential Decision-maker regarding Motor Purchases**

Title	2001		
	Industrial	Commercial	Overall
Maintenance Manager	32%	19%	28%
Engineer (Various)	19%	20%	19%
Plant Manager / Facility Manager	15%	9%	13%
Electrical Foreman / Electrician	12%	12%	12%
Lead Mechanic / HVAC Supervisor	1%	5%	2%
President / General Manager	2%	3%	2%
Purchasing Department	2%	3%	2%
Other	10%	25%	15%
Don't Know	6%	3%	5%
Number of Respondents	137	69	206

### ***Dealer Specifications***

Eighteen percent of respondents to the 1999 survey indicated that they provide a written specification to motor vendors in most or all cases compared with 29 percent of the current respondents. Twenty percent of the respondents in the commercial end-user category indicated doing the same.

Among respondents who indicated that they *do* provide written specifications to motor vendors, more than half of the 2001 respondents indicated doing so for all or most of the relevant horsepower categories. This figure was slightly higher (69%) in the 1999 survey. Further detail is provided in Table 4-22.

**Table 4-22**  
**Details of Written Specifications to Motor Vendors**

Frequency / Characteristic	1999	2001		
		Industrial	Commercial	Overall
Provide a written specification to motor vendors . . .				
In all cases	12%	14%	14%	14%
In most cases	6%	15%	6%	12%
In some cases	22%	20%	23%	21%
Never	60%	51%	57%	53%
<i>Number of Respondents</i>	<i>196</i>	<i>137</i>	<i>69</i>	<i>206</i>
Specification requires the use of Premium* motors. . .				
(of those who provide a written specification to motor vendors)				
In all relevant horsepower categories	51%	29%	27%	29%
In most of the relevant horsepower categories	18%	26%	36%	29%
In some of the relevant horsepower categories	24%	37%	9%	31%
Specification does not include efficiency standards	7%	3%	27%	8%
Don't Know	-	5%	0	4%
<i>Number of Respondents</i>	<i>76</i>	<i>38</i>	<i>11</i>	<i>49</i>

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

***Energy Analysis***

In the 1999 survey, approximately one-third of survey respondents reported that they or their motor vendors compare energy use among different models most or all of the time (Table 4-23). Results from the 2001 survey indicate a slight decline in this practice.

**Table 4-23**  
**Frequency of Energy Comparisons between Models**

Frequency	1999	2001		
		Industrial	Commercial	Overall
In all cases	19%	14%	27%	18%
In most cases	16%	15%	18%	16%
In some cases	33%	35%	24%	31%
Never	32%	36%	31%	34%
Number of Respondents	200	150	78	228

Respondents were queried for familiarity with IEEE Standard 841 for energy efficient motors (Table 4-24). The IEEE Standard applies to totally-enclosed, fan-cooled, horizontal and vertical, single-speed, squirrel cage polyphase induction motors, up to and including 500 hp, in NEMA frame sizes 143T and larger. The standard does not apply to motors with sleeve bearings and additional specific features required for explosion-proof motors. Familiarity among respondents in the industrial end-user category stayed about the same between 1999 and 2001 and closely matches the familiarity level among commercial end-users. Survey results show that use of the standard slightly increased among industrial end-users between 1999 and 2001. Use is somewhat less among commercial end-users.

**Table 4-24**  
**Familiarity with and Use of IEEE 841 Motor Specification**

Familiarity / Use	1999	2001		
		Industrial	Commercial	Overall
Familiarity				
Familiar	13%	12%	13%	12%
Unfamiliar	87%	88%	87%	88%
Number of Respondents	203	150	78	228
Use (among those familiar)				
Company uses IEEE 841 Standard	48%	72%	50%	64%
Company does not use IEEE 841 Standard	52%	28%	50%	36%
Number of Respondents	25	18	10	28



### 4.2.6 Perceptions of Premium Motors

In both 1999 and 2001, less than half of the survey respondents believe there are advantages to premium motors other than lower electricity use (49 and 42 percent respectively). Belief in other advantages was lower among commercial end-users (37 percent). Among respondents who believe in other advantages, longer life, better reliability, and better materials were among the top benefits cited. Further breakdown of responses is provided in Table 4-25.

**Table 4-25**  
**Advantages Associated with Use of Premium\* Motors**

Belief / Advantage	1999	2001		
		Industrial	Commercial	Overall
Believe in advantages other than lower electricity use	49%	42%	37%	41%
<i>Number of Respondents</i>	151	66	27	93
Noted advantages (among those recognizing advantages other than lower electricity use)				
Longer life	-	46%	60%	50%
Better reliability, less prone to break	77%	32%	20%	29%
Better materials	35%	18%	10%	16%
Cost savings	12%	18%	0%	13%
Rebate	-	7%	30%	13%
Energy efficiency	7%	14%	0%	11%
Less heat	9%	0%	40%	11%
Less vibration	1%	4%	0%	3%
Other	7%	7%	0%	5%
<i>Number of Respondents</i>	74	28	10	38

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

The proportion of respondents in the industrial sector who believe that premium motors have disadvantages other than higher initial price dropped from 17 to 9 percent between 1999 and 2001 (Table 4-26). Lack of availability was the most frequently cited disadvantage among those who believed other disadvantages exist.

**Table 4-26**  
**Disadvantages Associated with Use of Premium\* Motors**

Belief / Disadvantage	1999	2001		
		Industrial	Commercial	Overall
Believe in disadvantages other than higher initial cost	17%	9%	7%	9%
<i>Number of Respondents</i>	150	66	27	93
Noted advantages (among those recognizing advantages other than lower electricity use)				
Lack of availability	15%	17%	50%	25%
Less reliable, more prone to break down	46%	100%	0%	75%
Lower starting torque	15%	17%	0%	13%
Too much heat	27%	17%	0%	13%
More expensive to install	19%	0%	0%	0%
Other	33%	0%	50%	13%
<i>Number of Respondents</i>	26	6	2	8

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

#### 4.2.7 OEM Equipment

The proportion of industrial end-users who specify motor efficiency in most or all cases when ordering OEM equipment declined from 53% to 39% between 1999 and 2001. Further detail is provided in Table 4-27.

**Table 4-27**  
**Specification of Motor Efficiency When Purchasing OEM Equipment**

Frequency	1999	2001		
		Industrial	Commercial	Overall
In all cases	29%	21%	27%	23%
In most cases	24%	18%	21%	19%
In some cases	27%	25%	29%	27%
Never	20%	35%	23%	31%
Number of Respondents	154	150	78	228

Only two percent of industrial end-users in both 1999 and 2001 and 5 percent of commercial end-users indicated that their motors suppliers were never able to meet their motor efficiency specifications (Table 4-28).

**Table 4-28**  
**Ability of OEMs to Meet Motor Efficiency Specification**

Frequency	1999	2001		
		Industrial	Commercial	Overall
In all cases	41%	36%	28%	33%
In most cases	46%	50%	45%	48%
In some cases	10%	11%	17%	13%
Never	2%	2%	5%	3%
Don't Know	-	0	5%	2%
Number of Respondents	123	96	60	156

#### 4.2.8 Wait Times

In 2001, 30 respondents (9 commercial and 21 industrial end-users) reported that it was necessary to purchase a standard efficiency model from their supplier because a premium model was unavailable. Of these customers, industrial end-users reported this occurring on an average of 7 occasions over the past 12 months and commercial end-users an average of 3 occasions. In 1999, 25 percent of respondents encountered this problem an average of four times each.

The majority of respondents indicate that wait times for energy efficient motors is about the same as it is for standard efficiency motors. Additional detail is provided in Table 4-29.

**Table 4-29**  
**Wait Times for Premium\* Motors**

Length of Time	1999	2001		
		Industrial	Commercial	Overall
Longer than wait for standard efficiency motor	20%	29%	7%	23%
Shorter than wait for standard efficiency motor	0%	2%	0%	1%
About the same wait for both types	80%	61%	70%	63%
Don't Know	-	9%	22%	13%
Number of Respondents	142	66	27	93

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

Among the 21 respondents (19 industrial and 2 commercial) who reported a longer wait-time in the 2001 survey, an average of 8 and 9 additional days were reported for industrial and

commercial end-users respectively. In 1999, the 29 respondents who reported longer wait times for efficient motors estimated that the wait was 6 days.

More than half of the survey respondents in the industrial sector indicated that their motor vendors recommended premium motors when they purchased motors over the past year (Table 4-30). The proportion of industrial customers reporting these recommendations dropped slightly between 1999 and 2001.

**Table 4-30**  
**Motor Vendors Recommendation of Premium\* Motors**

Recommendation	1999	2001		
		Industrial	Commercial	Overall
Recommended Premium Motor	56%	52%	41%	49%
Did not Recommend Premium Motor	42%	40%	56%	45%
Don't Know	-	8%	4%	7%
Number of Respondents	152	65	27	92

\* "Premium Efficiency" used in 1999, "MotorUp or CEE qualifying" used in 2001

### 4.2.9 Repair Practices

Approximately the same proportion of industrial end-users reported rewinding versus replacing motors in the 1999 and 2001 surveys (85 and 83 percent respectively), but this figure is lower among commercial end-users (59 percent). Table 4-31 breaks these proportions down by horsepower category. There appears to be little change in rewind rates by industrial end users, with the exception of an unexplained increase in the 6 to 20 HP category.

**Table 4-31**  
**Repair and Rewind Practices**

Rewind Practices	1999	2001		
		Industrial	Commercial	Overall
Percentage reporting rewinding	85%	83%	59%	75%
<i>Number of Respondents</i>	160	150	78	228
Mean motors rewound by horsepower category				
1 – 5 HP	12%	9%	8%	9%
6 – 20 HP	19%	35%	40%	36%
21 – 100 HP	67%	66%	31%	58%
101 – 200 HP	77%	74%	15%	68%
<i>Number of Respondents</i>	62 – 130	65 – 121	7 - 40	-

In the 2001 survey, most commercial and industrial end-users reported that a 5 horsepower motor is the minimum size they would consider rewinding. Approximately 38 and 26 percent of survey respondents indicated that they had a policy to guide the rewind-versus-replace decision in the industrial and commercial end-user categories respectively (Table 4-32). By far, capital cost was the factor cited most frequently as the most important in this decision. The proportion of industrial end users who cited ROI or operating costs as their primary decision factor rose from 12% in 1999 to 27% in 2001. Nearly 20% still cite availability and minimizing down time as the major factor in their decision to repair or replace a failed motor.

**Table 4-32**  
**Repair Versus Replacement Decision**

Rewind Practices	1999	2001		
		Industrial	Commercial	Overall
Have a policy to guide decision	n/a	38%	26%	35%
<i>Number of Respondents</i>	-	125	46	171
Most important factor in deciding to rewind versus replace				
Capital cost	58%	50%	41%	48%
Total long-term capital and operating costs	7%	10%	20%	12%
Availability	3%	11%	9%	11%
Return on investment (ROI) or payback time	4%	9%	11%	9%
Operating cost	1%	8%	4%	7%
Minimizing down time / speed of rewind vs. replacement	16%	6%	4%	5%
Reliability	6%	2%	9%	4%
Other Factor(s)	4%	6%	2%	5%
<i>Number of Respondents</i>	136	124	46	170

In the 2001 survey, industrial end-users reported that motors are typically rewound twice before they are replaced, while commercial end-users reported a mean of 3 rewinds before replacement. In 1999, end-users indicated that motors are typically rewound twice before replacing.

Overall, less than one-fifth of motor end-users in the 2001 survey indicated that they provide specifications to their motor rewinder (Table 4-33). Pre- and post-wind efficiency testing is the most commonly specification provided to rewinders.

**Table 4-33**  
**Rewind Specifications**

Rewind Practices	1999	2001		
		Industrial	Commercial	Overall
Provide specifications to rewinder	20%	18%	15%	17%
<i>Number of Respondents</i>	136	125	46	171
Included specifications (among those who provide specifications to rewinder)				
Pre- and post-wind efficiency testing	37%	20%	40%	24%
Rewind to original specs	-	10%	40%	16%
Burn-out temperature	11%	10%	20%	12%
Coatings and insulation	26%	40%	20%	36%
Core loss testing	7%	15%	20%	16%
Other	14%	20%	20%	20%
Payback	-	5%	20%	8%
Post rewind operation testing	15%	5%	20%	8%
Turn-around time	-	5%	20%	8%
Wire quality	22%	15%	20%	16%
Shaft	-	10%	0%	8%
Voltage	7%	10%	0%	8%
<i>Number of Respondents</i>	27	20	5	25

#### 4.2.10 DOE Motor Program

Familiarity with the DOE Best Practices Program (formerly Motor Challenge) dropped slightly among industrial end-users between the 1999 and 2001 surveys. However a greater proportion (24% vs. 5%) reported using the program's materials and services. Awareness of the MotorMaster software rose slightly while its' use remained fairly stable. Additional detail is provided in Table 4-34.

**Table 4-34**  
**Familiarity, Promotion, and Use of DOE Motor Programs Software, and Materials**

Program Awareness and Use	1999	2001		
		Industrial	Commercial	Overall
Department of Energy Best Practices Program (formerly Motor Challenge)				
Aware of program	26%	19%	18%	19%
<i>Number of Respondents</i>	200	150	78	228
Use program materials / services	5%	24%	29%	26%
<i>Number of Respondents</i>	61	29	14	43
Department of Energy Motor Master Software				
Aware of software	11%	16%	8%	13%
<i>Number of Respondents</i>	202	150	78	228
Use software to guide motor selection in most cases	13%	9%	17%	11%
Use software to guide motor selection in some cases	13%	20%	17%	20%
Never use software to guide motor selection	74%	80%	67%	77%
<i>Number of Respondents</i>	23	22	6	28



In this section, we present a summary of the program's objectives, design, and administration as well as an analysis of program operations. We then present survey findings on dealer and end-user response to the program. Finally, we present information on the design, operation, and results of utility-sponsored programs to promote premium efficiency motors nationwide and assess the performance of MotorUp in the context of this national view. The findings in this section provide much of the basis for recommendations for program changes contained in Section 6.

## **5.1 MOTORUP OVERVIEW**

Since May 1998, the MotorUp working group has sponsored a regional motor rebate program targeted at integral horsepower motors purchased through distributors and dealers in the Northeast. The initiative is coordinated by NEEP (Northeast Energy Efficiency Partnerships, Inc.) and sponsored by electric utilities and efficiency administrators including: NSTAR, Conectiv Power Delivery Co., National Grid USA, Northeast Utilities (CT, MA and NH), Public Service Electric and Gas Company (PSE&G), Efficiency Vermont, Unitil/Fitchburg Gas and Electric, United Illuminating (UI), Long Island Power Authority (LIPA) and GPU Energy.

The objective of the initiative is to transform the Northeast market by substantially increasing use of energy efficient motors in applications where economically justified. MotorUp is structured as follows:

- The Initiative was established to create a common program across the region covered by the 12 sponsoring utilities and to avoid confusing differences across the regional market.
- Field implementation of MotorUp is administered by Applied Proactive Technologies (APT), which has four Field Representatives covering – Eastern New England, western New England, Long Island, and New Jersey; a Program Manager and Program Coordinator.
- APT markets MotorUp primarily through motor distributors and dealers – for the most part APT staff does not contact the end-user directly. Marketing to end-users is performed individually by each of the sponsors via their C&I customer representatives. APT staff does, however, provide some technical information and promotional materials to the distributor to pass on to the end-user. Recently, a quarterly newsletter and a direct mail piece have been developed for end-users.
- A rebate is issued to the end-user for purchase of CEE qualifying motors designed to cover about one-half of the cost differential between CEE and standard EPart models.

The motor must meet certain operational criteria, particularly over 2,000 hours of use per year

- Beginning in August 2000 a payment of \$25 has been made to the distributor for each qualifying motor rebated. This can be paid to the sales rep. or retained by the business owner or manager.
- While the reporting procedures vary somewhat among the sponsoring utilities all sales require information about the sale – the company, tax identification numbers, utility serving, motor information, application, etc. While the distributor is nominally responsible for collecting information about the sale, considerable time of the Program field reps is spent collecting information for the rebate application.

## 5.2 ANALYSIS OF THE MOTORUP INITIATIVE

In this section we analyze the results of the program, including the participation of distributors and end-users.

### *Trends in Participation*

**Overview.** Table 5-1 presents an overview of program participation and volume of rebate activity over the first three years of the program. Figures for 2001 are forecasted based on results of the first two quarters. The following observations can be drawn from this table.

- ***Trend in rebates.*** The number of motors rebated through the program grew by 71 percent between 1999 and 2000. However, this pace has slowed considerably. The results of the first two quarters suggest that the number of rebates will grow by roughly 4 percent between 2000 and 2001.<sup>1</sup> This may be due to the overall decline in the number of motors purchased in the region.
- ***Trend in customer participation.*** The number of customers participating in the program has grown very little; just 2 percent between 1999 and 2000 and a forecasted 8 percent between 2000 and 2001. However, relatively few of these customers (17 percent) participated in both 1999 and 2000. This result suggests that the program is reaching new groups of customers over time.

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<sup>1</sup> Forecasts are seasonalized. In 1999 and 2000, second half rebate volume exceeded first half volume by 25 – 27 percent.

**Table 5-1**  
**Indicators of MotorUp Participation**

	1999	2000	2001 (forecast)	Total Unique 1999 – 2000	Repeat Partic. 1999 – 2000
# of Applications	1,550	2,115	~2,175		
# Motors Rebated	1,649	2,824	~2,940	n/a	n/a
# Unique Customers	727	742	~765	1,323	220
#Unique Dealers	135	176	n/a	225	92

- ***Trends in Dealer Participation.*** The number of dealers participating in the program grew by 30 percent from 135 to 176 between 1999 and 2000. Ninety-two of these dealers participated in both years. APT estimates that there are between 360 and 400 motor dealers in the Northeast region. Thus, about half of the targeted vendors applied for and received at least one rebate through the program.

***Patterns of distributor participation.***

**The distributor participation in the Initiative is heavily concentrated with a small number of distributors who have made it an important part of their marketing program.** There are approximately 400 motor distributors locations in the MotorUp area, and of these a sizable portion of them participate in the Initiative to some extent. However the participation is heavily skewed toward a handful of heavily involved distributor organizations. Through the first quarter of 2001 the top ten distributor participants had accounted for 34% of the total of rebates awarded since the Program began, and the next 40 participants accounted for 33%. The remaining 175 distributor participants as a group accounted for only 33%.

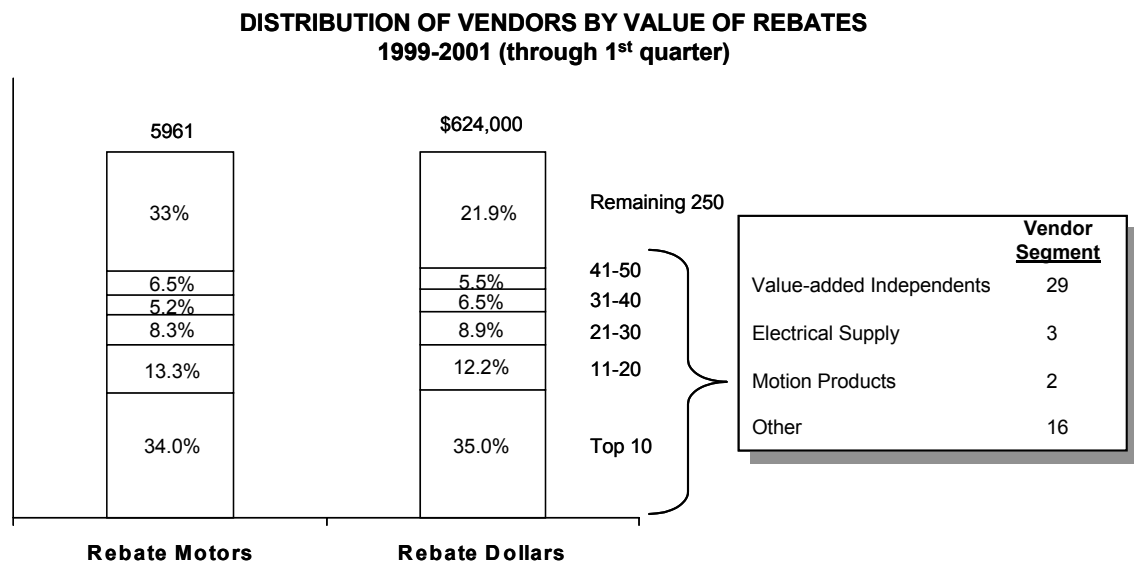
**The top 50 participants are strongly biased toward value-added independents.** The distribution of the top 50 by type of distributor is:

- Value-added distributors account for 58% of the top 50 participants in the Program as the “Motor-up” program fits naturally into their way of doing business. They are more willing to provide the customer with technical information about the motor, including the possible use of a premium motor, and MotorUp itself.
- Chains account for only 10% of the top 50 participants and the interest in the program. Generally a chain’s sales strategy is to provide a replacement motor quickly and at competitive cost, offering little technical advice. As a result they are less interested in premium motors programs. Most have shown little interest in MotorUp although a few branch managers have been active participants.

- The remaining third of the top 50 is made up of a variety of other distributors and contractors.

Figure 5-1 presents these results in graphic form.

**Figure 5-1**



### ***Patterns of End-User Participation***

The end-users with the heaviest involvement in the “Motor-up” program span a range of industry, generally heavy industry and telecommunications. There is some concentration of rebates with 20 end-users accounting for 20% of the motors rebated and 18% of the rebate dollars awarded. This group includes primarily industries with heavy investment in plants – paper, textiles, building materials and telecommunications.

The rate of rebates awarded has continued to increase since the Program launch. In 1999 the program awarded 2,182 rebates, 2,824 in 2000, and on a seasonalized annual rate, 2,940 in the first quarter of 2001. This represents steady if slow progress. Further it should be viewed in the context of a total market that is estimated to have declined possibly 10 to 15% in the past year.

### 5.3 INITIATIVE RESPONSE

Dealers/distributors and end users who responded to the telephone surveys were probed regarding their awareness and participation in MotorUp (see Sections 3 & 4 for details of the research). The relevant findings are discussed below.

#### 5.3.1 Dealer/Distributor Response

**Awareness of MotorUp.** Of the 100 dealers surveyed in 2001, 79 percent had heard of the MotorUp Initiative sponsored by their local utility and 70 percent claimed that they are currently participating in the program. In comparison, all 47 dealers interviewed for the 1999 Baseline study were familiar with and participated in MotorUp. This is an artifact of the selection procedure for the Baseline study, which targeted larger dealers who were major participants in the initiative.

Among the dealers that were not participating in the program in 2000, the most common reason for not doing so was that they were simply unaware of the program (Table 5-2).

**Table 5-2**  
**Reasons for Non-Participation in MotorUp**

	<b>2001</b>
Unaware of the Program	57%
Other	23%
Don't Know	13%
Too Much Hassle to Process Rebate Applications	3%
Customers Not Interested in Premium Motors, Even With Rebates	3%
Observations	30

Most dealers in the current survey (84 percent) reported being familiar with the efficiency specifications required for motors to receive rebates under the program. Seventy percent reported that they were familiar with the Consortium for Energy Efficiency standards, compared to 63% of the dealers interviewed in 1999.

**Share of qualifying motors sold through MotorUp.** According to dealers who participated in the initiative, about one-half (48 percent) of the qualifying motors sold during 2000 received rebates from MotorUp (Table 5-3). These figures are similar to those from the previous 1999 survey where dealers claimed that 50 percent of qualifying motors sold during 1998 actually received rebates.

**Table 5-3**  
**Rebating of Qualifying Motors**

<b>% of Qualifying Motors Sold Last Year That Received Rebates</b>	<b>1999</b>	<b>2001</b>
Mean	50%	48%
Median	50%	25%
# Observations	37	62

The dealers identified several reasons why some qualifying premium motors sold did not request rebates. See Table 5-4. In 2001, the primary reason cited is that customers did not want to fill out the rebate application form (35 percent). Other important reasons cited were that motors did not meet rebate requirements (24 percent), the customer was not interested in the rebate (16 percent), or was from out of the initiative area (14 percent). Most of the dealers interviewed in 1999 (69 percent) reported that the main reason that they did not seek rebates for qualifying motors was that their customers often did not want to fill out the application or were not interested in the rebate (72 percent). Some other key customer considerations were that they had no time to promote the initiative to customers (47 percent), that the customers were not informed of the initiative (44 percent), that the motors did not meet requirements (38 percent), and that they had no time to fill out the customer rebate forms (34 percent).

**Table 5-4**  
**Reasons for Not Applying for Rebates for Some Qualifying Motors**

	<b>1999</b>	<b>2001</b>
Customer Not Interested in Rebate	72%	16%
Customer Did Not Want to Fill Out Application	69%	35%
No Time to Promote Initiative to Customers	47%	2%
Customers Not Informed of Initiative	44%	4%
Premium Motors Did Not Meet Requirements	38%	24%
No Time to Fill Out Customer Rebate Applications	34%	2%
Out of Area/State	n/a	14%
Not Concerned With Rebate	n/a	6%
Other	38%	10%
Don't Know	n/a	2%
Observations	37	49

**Assistance to customers in filling out rebate applications.** Over 40% of dealers offered to assist their customers by filling out the motor rebate forms “in all relevant cases”. In addition, another 17% did so in most relevant cases. Only 17%-20% claimed that they never assist the customers. The data from the 1999 and 2001 surveys suggests that participating dealer practices in regard to assisting customers with rebate applications has changed very little over the past two years.

**Table 5-5**  
**Dealer Assistance with Rebate Forms**

<b>Dealers Offer to Fill-out Customer Rebate Application Forms...</b>	<b>1999</b>	<b>2001</b>
In All Relevant Cases	46%	40%
In Most Relevant Cases	17%	17%
In Some Relevant Cases	19%	23%
Never	17%	20%
Don't Know	0%	0%
# Observations	47-48	70

**Response to dealer incentive.** Eighty percent of the distributors interviewed in 2001 believe that the dealer incentive is an effective method to promote the sales of premium motors. Table 5-6 shows the distribution of reported recipients of the dealer rebates among the 70 participating distributors who responded to that question. Thirty percent reported that the dealer rebate went to the company. A roughly equal percentage reported that the dealer rebate went to the customer. This latter result may indicate that dealers frequently use the dealer rebate to provide an “extra” incentive to customers for purchasing premium efficiency motors. Alternatively, it suggests that the respondents are confused about the difference between the customer and distributor rebates.

**Table 5-6**  
**Recipients of Dealer Rebates**

<b>Who Usually Receives the Dealer Incentive?</b>	<b>2001</b>
The Company	30%
Customers	29%
Owner of Company	13%
Don't Know	9%
Other	9%
Salesperson	7%
Sales Manager	3%
The Branch	3%
<b>Observations</b>	70

Respondents were asked for suggestions to improve the MotorUp Initiative from their point of view and from the point of view of the customers. Table 5-7 shows the distribution of these suggestions. About a third of dealers suggested that the level of dealer incentives should be increased and 16 percent noted that paperwork could be reduced to make the initiative more effective from their point of view. About 10 percent of dealers suggested increasing initiative advertising and public relations efforts while another 10 percent suggested more effort be focused on customer education.

From the customers' point of view, roughly one-quarter of dealers suggested that their customers could profit from greater education efforts that focus on the benefits of premium motors. The

dealers also thought increasing the level of customer rebates (19 percent), reducing rebate paperwork (16 percent) and enhanced initiative advertising and public relations efforts (16 percent) would be valuable changes.

**Table 5-7**  
**Suggested Initiative Changes**

Initiative Change	For Dealers	For Customers
Increase Level of Dealer Incentives	27%	6%
Reduce Paperwork	16%	16%
Increase Initiative Advertising, Public Relations	10%	16%
Increase Customer Educ Re: Benefits of Premium Motors	10%	26%
Increase Level of Customer Rebates	6%	19%
Lower Price of Motor	6%	3%
None/ No Changes	4%	7%
Include Definite and Special Purpose Motors	0%	0%
Allow Contractors to Collect Rebates Directly	0%	0%
Other	9%	7%
Don't Know	26%	16%
# Observations	70	70

### 5.3.2 End User Response

**Awareness of MotorUp.** Approximately half of the 2001 survey respondents indicated that they were familiar with the MotorUp Initiative sponsored by their local utilities. The initiative was described as “offer[ing] rebates for the purchase of premium efficiency motors.” Results for the 2001 are lower than 1999 survey results by approximately thirty percent. Possible reasons for this discrepancy include the fact that the 1999 survey referred to any program offered by respondents’ utilities that offered rebates for premium efficiency motors rather than MotorUp alone. Results are further detailed in Table 5-8.

**Table 5-8**  
**Awareness of MotorUp**

Awareness	1999 <sup>2</sup>	2001		
		Industrial	Commercial	Overall
Aware of Initiative	85%	53%	46%	50%
Not Aware of Initiative	15%	47%	54%	49%
Number of Observations	204	150	78	228

<sup>2</sup> MotorUp! program not mentioned in 1999 survey; referred to as “utility-sponsored program offering financial incentives for purchase of premium-efficiency motors.”



**Source of MotorUp awareness.** Among those aware of MotorUp, respondents most frequently identified their utility customer representatives as the source of awareness. Motor dealers and distributors were only mentioned half as frequently as utilities. Roughly one-half of all customers who claimed to be aware of the initiative reported that their motor dealer was promoting it. Motor dealers are supposed to be the major source of marketing effort for the initiative. These findings suggest that initiative marketing efforts among dealers are inconsistent at best. Further detail is provided in Table 5-9.

**Table 5-9**  
**Sources of Awareness of MotorUp**

Source	1999 <sup>2</sup>	2001		
		Industrial	Commercial	Overall
Utility customer representative	72%	57%	47%	54%
Dealer or distributor	21%	29%	28%	29%
Colleague or competitor, word of mouth	9%	11%	11%	11%
Bill stuffers or direct mail from the utility	15%	6%	8%	7%
Print advertisement	1%	5%	6%	5%
Contractor	0%	3%	6%	3%
Seminar / course sponsored by utility	3%	0%	3%	1%
Other	6%	3%	6%	3%
Don't Know	5%	1%	3%	2%
Number of Observations	173	79	36	115

**Influence of the initiative on premium motor purchases.** The customer survey contained a number of items that probed the importance of the initiative in participants' decisions to purchase premium efficiency motors. Generally, participants attributed relatively little influence to the initiatives. One item asked customers to rate the influence of the initiative on a five-point scale. Table 5-10 displays the results.

**Table 5-10**  
**Rating of MotorUp Influence**

Rating of initiative influence	1999	2001		
		Industrial	Commercial	Overall
Program is extremely influential in motor purchase decisions	*	15%	22%	17%
Initiative is very influential in motor purchase decisions	*	8%	17%	11%
Initiative is influential in motor purchase decisions	*	30%	22%	27%
Initiative is somewhat influential in motor purchase decisions	*	25%	9%	19%
Initiative is not at all influential in motor purchase decisions	*	23%	30%	25%
<i>Number of Respondents</i>	-	40	23	63

\* Question not asked in 1999 survey.

Overall, 28 percent of initiative participants rated influence in the top two categories. The initiative appears to have exercised more influence on commercial customers (39 percent in the top two categories) than industrial customers (23 percent in the top two categories). This is to be expected given that industrial end-users tend to buy more and larger motors than commercial customers.

Participating customers were asked to estimate the share of qualifying motors they purchased in the year prior to the survey, and the percentage of those premium efficiency motors that they would have purchased in the absence of the initiative. The results from these questions are displayed in Table 5-11. On average, participating customers reported that they would have purchased 85 percent of the premium motors that they actually did purchase if the rebates had not been available. These results are consistent with the relatively low initiative influence ratings reported above. However, note that end users were not asked to consider other effects of the initiative besides rebates, such as enhanced dealer promotion and marketing.

**Table 5-11**  
**Purchase of Qualifying Motors\*\* and Initiative Influence**

Rebates	1999	2001		
		Industrial	Commercial	Overall
Mean percentage of motors qualifying for rebates in past year	*	34%	52%	40%
<i>Number of Respondents</i>	-	39	21	60
Mean percentage of motors actually rebated (of motors qualifying for rebates)	*	60%	52%	57%
<i>Number of Respondents</i>	-	36	20	56
Mean percentage of purchased motors would have been purchased had rebates been unavailable (of motors qualifying for rebates)	*	85%	86%	85%
<i>Number of Respondents</i>	-	38	21	59

\* Question not asked in 1999 survey. \*\*Weighted by Number of Motors > 1HP Purchased by Facility in Past 12 Months

Table 5-11 contains a number of other interesting results. First, the percentage of qualifying motors purchased reported by industrial customers is very close to regional estimate developed from manufacturers' data: 34 percent v. 27 percent. One would assume the premium share among participants would be somewhat higher than it is among the population as a whole, but not extraordinarily so. This result likely reflects industrial users' greater-than-average knowledge of efficient motor products. The second interesting finding is that the customers' estimate of the percentage of qualifying motors for which they sought rebates is roughly equal to the percentage of qualifying units rebated reported by dealers: 57 percent for customers v. 50 percent for dealers. Manufacturers' data suggest that regional purchases of qualifying motors account for 6 times the number of units sold through the initiative.

**Response to rebate application process.** Respondents indicated that time availability and confusion about eligibility and the application process were among the top reasons for which rebates were not pursued for qualifying motors. Further breakdown is provided in Table 5-12.

Among end-users reporting purchase of motors qualifying for rebates who only applied for rebates for *some* of their purchases, the most frequently-cited reason was simply that intended to do so but forgot (14 percent of 22 respondents in industrial and commercial user groups combined).

**Table 5-12**  
**Reported Reasons for Not Applying for Rebates on Qualifying Motors**

	1999	2001		
		Industrial	Commercial	Overall
No staff time available to complete the rebate application	12%	18%	6%	15%
Not sure if motors they need are eligible for rebates	12%	18%	0%	14%
Not sure how to go about applying for the rebate	12%	14%	6%	12%
Too much hassle to apply for the rebate	9%	11%	11%	11%
No time	0%	7%	11%	8%
Haven't used motors yet	0%	7%	0%	5%
Company hasn't approved it	0%	4%	6%	5%
Rebates aren't large enough to make it worthwhile	9%	4%	0%	3%
Handled by someone else	0%	4%	0%	3%
Didn't know rebates existed	21%	-	-	-
Other	20%	14%	8%	13%
Number of Respondents	43	28	8	36

## 5.4 PROGRAM COMPARISON

This section describes and compares major motor efficiency marketing programs. It also highlights similarities and differences, draws some conclusions about “lessons learned” and identifies some options for program designs and implementation. Most of the programs have had similar “time in place”, but none have really been established long enough to provide conclusive evidence of market transformation or the superiority of one approach over another. Taken in total, however, the experiences and results provide reasonable bases for identifying possible market impacts and assessing program design features.

### 5.4.1 Overview

This review covers major motor programs that have significant market coverage, including the Pacific Northwest (NEEA) and four utility programs in California (in addition to the Northeast and NYSERDA). Like the Northeast, these areas have a long history of energy efficiency promotional efforts, and the individual utilities have other energy efficiency promotional programs for other applications and equipment. While the California programs are not jointly administered, they have some basic similarities and are influenced by common state funding and other directives.

These areas, along with the Northeast and NYSERDA, are among the most active state wide or regional, multiple utility programs, and combined represent an estimated 25 to 30+% of the total national integral motors market. They also feature a higher share for high efficiency motors (CEE standards – often referred to herein as “qualifying motors or QMs) relative to total motors, estimated at 16 to 20% share versus 9 to 12% share for the remaining national market. The portion of the market covered is significant enough to be noticed by motor manufacturers and to influence their product development and marketing of CEE efficiency level motors.

### 5.4.2 Evolution and Convergence of Programs

All of these programs have “market transformation” as an ultimate goal, but have experienced varying evolutionary paths, program designs and relative successes. While none have been in place long enough (or fully funded) to have achieved the ultimate goal of market transformation, some early indications of progress and lessons learned can be highlighted.

Several types of convergence among the programs appear to be occurring. CEE prescribed efficiency levels are becoming common requirements in the programs (and better known among dealers and customers in the markets). Although the primary targets, nature of payments and administrative details of the incentives still vary among the programs, similar schedules of basic incentives (\$ incentives by motor size) are also becoming similar.

There is growing recognition that both dealers and customers need to be educated, informed, provided with analytical and decision making tools, and provided with some incentives to remove barriers to selection of CEE efficient motors. Solely “push” (dealer focused) or solely

“pull” (end-user focused) strategies have not proven effective, and most programs are evolving to include a combination of push and pull elements.

There are still open questions about the relative effectiveness of various types, levels and targets of incentives (e.g. dealers, customers, both), as well as specific aspects of program design, promotion and implementation. There are also questions about the degrees of free ridership, the actual impact of incentive programs on higher efficiency motor sales and the cost efficiency of various program approaches. All in all, most programs evidence some noticeable market changes, but few can point to unequivocal, and rigorously quantified market results.

### **5.4.3 Brief Descriptions of Motor Efficiency Programs**

The following are brief descriptions of the motor efficiency programs believed to be the most active “regional” programs, and the most relevant for the comparative purposes of this project. The descriptions are based upon a modest amount of both secondary research and primary interviews with program management. It should be recognized that this was a relatively modest portion of the work plan and budget. Nevertheless, it can be of significant value in assessing the MotorUp and NYSERDA programs, and in considering options for program modifications going forward.

#### ***Pacific Gas and Electric (PG&E)***

PG&E’s Express Efficiency Program began in 1999 as part of California’s statewide energy efficiency plan. Initially, incentives were targeted at customers and in the first year about 500 rebates were disbursed. Displeased with these results, PG&E shifted the incentives and promotional efforts to dealers in the second year. About half of the 110 targeted dealers participated in the program and 2,426 motor rebates were disbursed. Program managers estimate that the share of premium efficiency motors being stocked by dealers has doubled. (This result is very much at odds with findings from the current MotorUp study.)

In addition to the change in focus, the application process was simplified and changed to an electronic format – applications can be downloaded in MS Excel format from PG&E’s Web site using an ID number supplied by the program manager. The Web site also provides a matrix of eligible motors and other applications information. Qualifying efficiency values adhere to prescribed CEE Motor Initiative efficiency levels. The incentives range from \$35 to \$630 (for 1 to 200 HP) depending on motor size and cover about half of the incremental cost differential between standard and high efficiency motors. Applications are accepted on a first-come, first-serve basis until appropriated funds are exhausted.

Current marketing efforts are directed at dealers and include: visits and telephone contacts, direct mail, print ads in trade publications and web-based information, such as tips on selling premium motors. Over the next two years, PG&E expects to implement an end user educational

campaign, and may revise the program to include a split rebate program, where both dealers and customers would receive incentives.

### ***Southern California Edison (SCE)***

SCE's Express Efficiency Program began in 2000 as part of California's statewide energy efficiency plan. In March 2001, a vertical shaft incentive program (covering motors in the 5-50 HP range, the same as the base program) was added to reflect the needs of dealers serving water pump applications in the agricultural markets.

Incentives are aimed at dealers, and the program's dealer "base" is viewed at about 80 dealers, out of a possible total of about 200. Sales quotas (viewed as the starting point where incentives kick in) are negotiated with dealers, and the dealers need to exceed their quota in order to receive significant incentive payments. Dealers failing to meet their quota receive only a minimal "faxing fee". Because of this feature, SCE paid incentives for about half of the total 1,000+ qualifying efficiency motors sold in 2000, as about 500 represented the total quota baseline.

Qualifying efficiency values adhere to prescribed CEE Motor Initiative levels, with the incentives ranging from \$35 to \$200 depending on motor size (1 to 200 HP). Dealers may keep all of the incentive or pass some along to customers (this is not tracked by SCE). Dealers enroll in the program by submitting a copy of the end-users' invoice to SCE. Applications are accepted on a first-come, first-serve basis until appropriated funds are exhausted.

About \$133,411 incentives was disbursed to dealers in 2000 for 1,021 qualifying motors. Expectations for 2001 are uncertain, as the program budget has been cut from \$500,000 in 2000 to \$280,000 in 2001 and staffing and marketing efforts have been reduced. The program includes field presence (calls, visits, seminars, etc.), in addition to printed materials and mailings. Possible enhancements moving forward would be to restore the budget cuts and increase the HP covered from 50 to 200 HP.

### ***San Diego Gas and Electric (SDG&E)***

SDG&E's Upstream Motor Dealers Incentive program was started in 1999 as part of California's statewide energy efficiency plan. The incentives are designed to increase dealer stocking levels of prescribed CEE high efficiency motors of 1 to 200 HP.

Incentives to dealers range from \$35 to \$630 per motor sold, depending upon HP. Applications must include a copy of the customer invoice and are accepted on a first-come, first-serve basis until appropriated funds are exhausted. In 2000, incentives accounted for about 77% of the program's total budget of \$123,000.

The level of marketing is currently modest, and consists of ongoing program manager contacts with dealers and direct mail pieces, which do not include formal brochures, efficiency guides or

other specifically developed analysis or decision “tools”. SDG&E makes limited use of MotorMaster+ software, and has hosted a few customer seminars on motors and VFDs.

Some improvements in stocking patterns for participating dealers have been identified, but only a modest number of dealers are actively participating in the program. A few dealers represent a high proportion of total activity. Budget reductions and uncertainties have been a major problem.

### ***Sacramento Municipal Utility District (SMUD)***

SMUD’s Motor System Efficiency Initiative was started in 1999, having evolved from earlier programs dating back to 1994. It includes a diagnostic program, with a modest fee, where SMUD motor specialists run tests on motors and pump systems on site and discuss the results with customers. A customized incentive program focuses on reducing demand during peak load times (\$250 per kW reduced), while the prescriptive program provides incentives of \$25 to \$630 (for 1 to 200 HP) for purchases of motors that meet CEE prescribed efficiencies. Incentives are on a first come, first serve basis in competition with other eligible equipment.

Incentives may go to dealers, end-users or contractors, but only one payment to one party for each motor installed. The target emphasis has varied between dealers and end-users, with the current emphasis shifting to end-users. Marketing includes direct mail pieces, contacts by SMUD Energy Specialists, trade shows, workshops and community events. SMUD is also putting together a “tool kit” of useful information from various sources that will include MotorMaster+ and other software. Customer education regarding proper motor selection and awareness of motor repair options and criteria are important needs.

Efforts are underway to simplify the application process – from a formal written agreement (as previously used with dealers) to a single page application, with signature of dealer or customer and a copy of the sales receipt or invoice. A SMUD supervisor must approve payment after checking motor and end-user applicability. At least a dozen dealers have formally participated in the program and between 50 and 100 customers have received rebates.

Results have been limited by available funding, which also supports other energy application programs, such as lighting and HVAC. During 2000, no motor rebates were distributed, as the limited budget was devoted to other applications. Levels of funding for motor incentives will depend upon the amount of additional funds received from the California Energy Commission (which is unknown at this time).

### ***Northwest Energy Efficiency Alliance (NEEA)***

NEEA’s high efficiency motors program has undergone dramatic changes since its inception in early 1997. It is funded by NEEA utility members and administered by the Electric League.



NEEA has an Executive Director and staff, and a Board of Directors that includes representatives from the public and investor owned utilities serving the region (Washington, Oregon, Idaho, Montana), selected consumer and energy conservation groups and the state governors. Motors is just one of NEEA's programs, which cover a broad range of energy applications, end-user markets and types of equipment. Total budgets have been about \$20 million per year, with motor programs running about \$650+ for the first three years, and about \$1.4 million currently.

The initial "Premium Efficiency Motors Program" was started in the 2<sup>nd</sup> quarter of 1997 as a typical incentives program aimed specifically at changing the stocking and sales practices of motor dealers and improving customer awareness of higher efficiency motors. As this was just at the time the EPACT standards were going into effect there were considerable uncertainties and lack of understanding in the market. Over the first year 60 dealers (about a third of the total targeted) were involved in generating over 450 rebates in the first seven months. Activity was highly concentrated among a couple of dozen dealers and fewer than a dozen major industrial customers.

This program was discontinued after a year because market research and program evaluation indicated that dealer stocking of efficient motors was not a primary barrier to sales of these motors in the Northwest. In 1999, a revised program, "Drive Power Initiative", was introduced with an emphasis on working closely with customers and providing them with the analytical tools, training and internal selling capabilities needed to change their motor management and repair practices. Two primary services are broad customer education and tailored 1-on-1 customer services to address specific motor management issues, combined with an information campaign to influence motor repair and rewind shops' practices. All services support the CEE standards.

The services are provided by specially trained, well-qualified field consultants, referred to as "circuit riders". They use motor analysis tools, repair guides and specifications, sample procurement policies, case studies, onsite motor testing and staff training in working directly with customers on site. Publication and promotion of "success stories" in various print and meeting formats is an important part of the program.

Based upon various "progress" measures (measures of progress in implementing the program and initial changes in market and customer behaviors) the program is on track and delivering upon initial expectations. Because of the nature of the goals (which are long range) and the structure of the program (providing the tools for change), quantitative market results (such as increased CEE efficient motor sales) are hard to document. Additional market research and program evaluations are in progress or being planned.

#### **5.4.4 Summary Comparisons Among Programs**

The following table summarizes selected aspects of the motor efficiency programs for general comparative purposes. Variations among the programs with respect to timeframes, budgeting



and reporting practices, definitions and other factors make direct comparisons difficult and potentially misleading. The information in the table should be used as general indicators and perspectives, rather than as detailed, exactly comparable statistics, and should be viewed within the context of the preceding program descriptions.

Comparison of the total annual budgets shows evidence of a relationship to estimated market size. Comparison of the total cost per motor rebated indicates a potential relationship to program time in force, but the limited data and time involved make any conclusions on this tentative at best.

Table 5-13

### High Efficiency Motor Programs: Comparison of Selected Factors

Program	PG&E	SCE	SDG&E	SMVD	NEEA	MotorUp	NYSERDA
Year Program Started	1999	2000 March	1998	1999	1997; 1999	1998	1999
Estimated Market Size (Integral Motors)	40-60K	50-70K	7-15K	3-10K	30-40K	95-125K	60-70K
Total Annual Budget (2000)	\$800K	\$500K (00) \$280K (01)	\$123K	\$<50K	\$300K	\$700K	\$500K
High Efficiency Level	CEE	CEE	CEE	CEE	CEE	CEE	CEE
Key Program Features:							
Primary Incentive Target	Dealer	Dealer	Dealer	Dealer or Customer	NA	End-user	Dealer
Secondary Incentive					NA	Dealer	End-user
Other Services	Education	Education		Diagnostics	Motor Mgt. Practices	Education	Education
Incentives in 2000:							
\$s	\$600K	\$133K	\$95K	None	NA	\$310K	\$88K
Units	2,400+ Motors	1,000+ Motors	400+ Motors			2,800+ Motors	1,100+ Motors
\$/Unit	\$250	\$133/\$266	\$238		NA	\$111	\$80
Market Share	4 - 6%	<1%	3 - 6%	n/a	n/a	3%	2%
Participation	70+ Dealers	50+ Dealers	9+ Dealers	10 Dealers 50-100 End-users	60+ End-users	200+ Dealers	25+ Dealers
Total Cost Per Motor Rebated	\$333	\$500	\$308	NA	NA	\$250	\$450

\* New starting 7/01; separate budget

### **5.4.5 Summary of Program Comparison**

This section highlights some conclusions that can be drawn from the program comparisons, coupled with the detailed research on the MotorUp and NYSERDA programs. It should be recognized that only the latter two programs were analyzed in detail, and that in many cases, the inferences should be viewed as directional insights (that require further testing) rather than firm conclusions. Nevertheless, we believe that they are valuable considerations for program planning purposes.

#### ***Objectives and Resource Commitments***

- Initial goals and expectations are generally overly optimistic and unrealistic, requiring revisions and often misunderstandings and ill-feelings among the program team and market participants.
- Resource commitments are often uncertain or intermittent (e.g. first come, first serve until the funds are gone), which causes confusion and reluctance to participate and make their own commitments among dealers and customers.
- Budgets are frequently modified and reduced with little warning or consideration of channel partner or end-use customer decision lead-times or sensibilities, causing caution in their commitments and long-term policy changes.
- The extreme difficulties, resources and time required to truly cause market transformation are typically not fully understood or appreciated by program sponsors.

#### ***Similarities Among Programs and Experiences***

- Virtually all programs have been modified due to experiences and have evolved over time to meet market realities.
- Programs discover that education and promotion to both dealers and end-users is required, and dealers are seldom capable of doing this on their own.
- All of the programs support CEE efficiency levels, and similar dollar incentive levels by motor size for those with incentive programs (MotorUp and new NYSERDA incentive levels are a little higher for than the California programs).
- Promotional and operating activities, incentive applications and payments tend to be highly concentrated among a limited number or proportion of dealers and end-users.

- All of the programs have dollar caps or timeframe limits on rebates or incentives, and have “first come, first serve” features – that can cause confusion and reduced participation in the market.
- Similar types of market materials, technical “tool kits” and marketing support activities are employed with dealers and end-users.
- Participation appears to “top out” at 4-5 percent of integral horsepower (1 – 200 HP) motor sales.

### ***Differences Among Programs and Experiences***

- The degree of consistency in program funding, support and basic structure varies among programs.
- The relative ease of dealer, end-user and individual transaction application processes, varies considerably among programs, but all are working on simplifying processes.
- The primary target and mix of incentives between dealer and end-users varies considerably.
- The specifics of incentive structures and “rules of the game” usually differ in a few key aspects.
- Interaction with other energy efficiency programs and individual utility activities ranges from close and well coordinated to no interaction, or even negative comments.
- The degree of clear market commitment and believability by the market varies because of past experiences and the current utility and market situation.
- The nature of relationships between sponsoring utilities, program deliverers, dealers and end-users is influenced by past experiences and strongly influences current behaviors regarding the motors programs.

### **5.4.6 Key Lessons Learned**

- A fundamental, missionary sale effort is required, that will not be accomplished by manufacturers or dealers on their own.
- There is “free ridership”, but also non-applications for incentives (particularly in customer-focused programs).
- Training and education on motor efficiency issues are needed for both dealers and end-users.

- Changing end-user purchasing practices requires more than technical support, e.g. financial, operations, senior executive decision support, and other capabilities are required.
- There are needs to develop and provide various technical / operating materials and “tool kits” to both dealers and end-users.
- End-user promotion, education and training (and related materials) by the program sponsors / administrators are required, whether the program is dealer or end-user focused. Dealers and manufacturers cannot be relied upon to provide these on their own.
- Long timeframes are required for market transformation at the manufacturer, dealer and end-user levels, 3 to 5 years minimum, 5 to 8 years realistically.
- Applications and processing need to be as simple as possible, and avoid time consuming special requirements (such as original signatures). They should be made as electronic and user friendly as possible.
- The relative effectiveness of dealer-focused versus end-user focused programs is not clear, and some mix of incentives and education to both dealers and end-users seems to be preferable.
- Motor repair, systems improvements and motor management practices all need to be addressed as part of motor efficiency incentive programs.
- There are many factors other than motor efficiency that influence the motor markets and high efficiency motor share (e.g. economic trends, recessions, competitive pressures, technical and application quirks) that need to be considered when establishing or evaluating motor efficiency programs.

In this section we summarize findings from Sections 2 through 5 that are particularly useful in highlighting the accomplishments of the program, the challenges that remain, and practical means for addressing those challenges. We then present recommendations regarding potentially productive changes to program design and operation.

## **6.1 KEY FINDINGS**

### **6.1.1 Manufacturers**

**Manufacturers have made significant progress in supporting the development of the market for premium efficiency motors over the past two years. Regional motor rebate programs have provided an important motivation for these developments.**

Evidence of market progress in the manufacturing sector includes the following key points.

- Most of the major manufacturers have filled out their lines of premium motors to conform to CEE standards. Further at least one major General Electric has redesign under way that will bring all its premium motors into compliance.
- The incremental cost of premium motors over standard EPart motors has been stabilized or held the same, reducing the first cost penalty of purchasing a more efficient motor. In particular, the cost of small qualifying motors has decreased significantly.
- The manufacturers through their trade organization, NEMA, have worked constructively with CEE to jointly develop a more workable standard premium designation that should act to reduce confusion between qualifying and non-qualifying premiums in the future.
- There has been a small increase in the market share of premium motors on a national basis and the pre-EPart motors have been sold out of inventory.

Evidence of the influence of regional motor rebate programs on manufacturer decisions includes the following.

- Manufacturers consider the rebate programs to be effective. They also consider the programs to be an important part of overall regional marketing efforts.
- Manufacturers' willingness to negotiate a NEMA Premium™ standard with CEE in part reflects an acknowledgment of the need for a national standard to be applied to rebate programs.

### 6.1.2 Distributors

**Distributors have shown very spotty and inconsistent progress in supporting efficient motors programs.** The distributors as a group have been very inconsistent in their interest and involvement in efficient motors programs. While a small number have participated extensively and enthusiastically, most have not. On balance there has been some scattered and inconsistent progress:

- A relatively large share of the region's motor distributors – 225 out of approximately 400 -- have participated in MotorUp. However, the top 10 dealers account for 34 percent of all motors rebated. The top 50 account for 74 percent of motors rebated. Thus, it is clear that no more than 10 – 15 percent of the region's motor dealers are making the program a regular part of their sales and marketing effort.
- The number of dealers seeking rebates through the program has increased in a slow but steady fashion over the course of the program.
- There has been no significant change in the percentage of premium motors stocked over the past two years.
- There has been inconsistent pattern of change in promotional and sales practices – the majority of distributors have made no change.
- There has been a small inconsistent pattern of increase in the share of premium motors sold.
- About 25% of distributors report increased effort to promote new motor purchase (not necessarily premium) over rewind. It should be recognized that some of this change is driven by the increasing cost of rewind, and most of the change has come in small horsepower ranges.

### 6.1.3 End Users

**In general, end-users have shown little evidence of progress in knowledge and understanding of motor efficiency opportunities or in purchases of premium efficiency motors. A sizable segment of end users who have relatively accurate understanding of motor efficiency opportunities and who purchase a significant share of premium efficiency motors has emerged. This segment currently accounts for about 20 percent of the market. However, this segment has grown only slightly over the past two years.**

The key findings about general conditions in the end-user market are as follows.

- The end-user is still thoroughly confused about efficiency designations. (Here the NEMA standard premium designation should help)

- The level of adoption of purchase policies and other practices that might increase the share of efficient motors remains relatively low and there is no evidence that it is increasing. The share of customers that report having such policies increased from 31 to 39 percent from 1999 to 2001.
- Availability of premiums is still perceived as a problem by many end users. Thirty-three percent reported that they purchased a standard efficiency unit instead of a premium model in the past year because the appropriate premium unit was not available soon enough. The average number of such instances was 7 for those who experienced them.
- The percentage of failed motors repaired or rewound has remained nearly constant over the past two years, despite decreases in the price of motors and increases in repair costs.
- Participating customers attribute little influence to the Program in their motors purchase decisions. Only 38 percent attribute significant influence to the program over their motor selection decisions. On average, participating customers report that they would have purchased 85 percent of the qualifying motors that they bought in the past year in the absence of the rebates.

We defined the “active” segment of the end-user market as customers who reported purchasing CEE-qualified motors, whether or not they participated in the program. Key findings in regard to the active segment of the market are as follows.

- These customers purchased a high percentage of CEE-qualifying motors: mean of 60 percent.
- The clearest differentiator between the active segment and all other companies in the sample was the degree to which customers in the active segment had adopted policies and procedures to guide motor purchases. Sixty percent of the active segment had such policies v. 25 percent of the remainder of the sample companies. Thirty-three percent of the active segment estimated motor energy as part of their motor selection process versus 14 percent for the remaining customers. Twenty-three percent of the active segment were aware of MotorMaster+ versus 10 percent for the remainder. Forty-nine percent had a policy to guide the decision to rewind or replace a failed motor versus 30% for remaining customers.
- As would be expected, these companies were slightly larger than average in terms of number of employees (548 versus an overall sample mean of 459), number of motors installed (465 v. 401), and number of motors purchased in the past year (69 v. 37). Customer size, however, did not prove to be an important discriminating factor in terms of knowledge or use of CEE-qualifying motors.

These findings clearly emphasize the importance of customer education and provision of model policies and tools to guide customer purchase behavior.

### 6.1.4 Initiative Assessment

**The MotorUp Initiative does have strengths as it has generated momentum in the Northeast.** Specifically it has:

- Achieved a high level of participation with a core group of distributors. While 50 distributors represent two-thirds of the rebates awarded, these core distributors have achieved high levels of participation. The field representatives have established good rapport with this group.
- The numbers of rebates have climbed steadily since the Initiative began, including this year in a depressed motor market in the region.
- Payment of incentives to the distributors has increased their acceptance and use of the Initiative.

**There are, however, clear areas where improvement is needed:**

Distributors, program contractor staff, and other stakeholders consistently identified the following areas as needing improvement.

- There is a clear need for an expanded program in customer training and education. Research shows that the end-user purchasing behavior has not been significantly influenced by the Program. MotorUp will not reach its goals of transforming the market relying solely on a distributor program. An education/training program that directly targets the motor-purchase decision-maker is needed.
- The rebate application process should be streamlined. At present far too much time is required by the field rep and the distributor to collect information for the applications that is repetitive and not necessary. This time could be better spent on direct promotion of the Initiative and its objectives.

## 6.2 CONTEXT FOR INTERPRETING KEY RESULTS

Before offering recommendations concerning program design and operations, we believe it is worthwhile to consider a number of background factors in interpreting the key results.

**Underlying economics of selecting premium efficiency motors.** Despite recent increases in electricity costs and decreases in the incremental costs of premium motors, the economics of upgrading from an EPAct to a premium motor are compelling under a fairly narrow range of conditions. Table 6-1 shows the simple payback for upgrading from an EPAct to a CEE qualifying motor for different categories of horsepower and annual operating hours. We assume an average cost per kWh of 8.6 cents, the current average revenue per kWh for industrial



customers in the New England states. The corresponding figure for the Mid-Atlantic states, including New York and New Jersey, is 6.0 cents/kWh.

**Table 6-1**  
**Simple Payback for Premium Upgrade: New England**  
**By Horsepower and Annual Hours of Operation**

Horse- power	<1000	1000- 2000	2000- 3000	3000- 4000	4000- 5000	5000- 6000	6000- 7000	>8000
1-5	13.0	6.5	3.9	2.8	2.2	1.8	1.5	1.2
5-10	11.5	5.8	3.5	2.5	1.9	1.6	1.3	1.1
10-20	15.9	8.0	4.8	3.4	2.7	2.2	1.8	1.5
20-50	16.0	8.0	4.8	3.4	2.7	2.2	1.8	1.5
50-100	26.2	13.1	7.9	5.6	4.4	3.6	3.0	2.5
100-200	29.4	14.7	8.8	6.3	4.9	4.0	3.4	2.8
>200	26.7	13.4	8.0	5.7	4.5	3.6	3.1	2.5

We further assume that industrial customers seek a 2-year payback or better on investments in energy efficiency. This is a standard assumption used in program planning and marketing. Finally, we assume that the current program incentives reduce the incremental cost of the premium motor (over EPC prices) by one half.

Under these assumptions, customers should be willing to purchase premium efficiency motors in all instances where simple payback on the un-discounted incremental cost is 4 years or less. These groups of motors, defined by size and operating hours, are shaded on the table. These categories encompass roughly 50 percent of all motors sold. Under current energy price conditions in New York and New Jersey, the percentage of motor replacements offering an attractive payback is reduced to 32 percent.

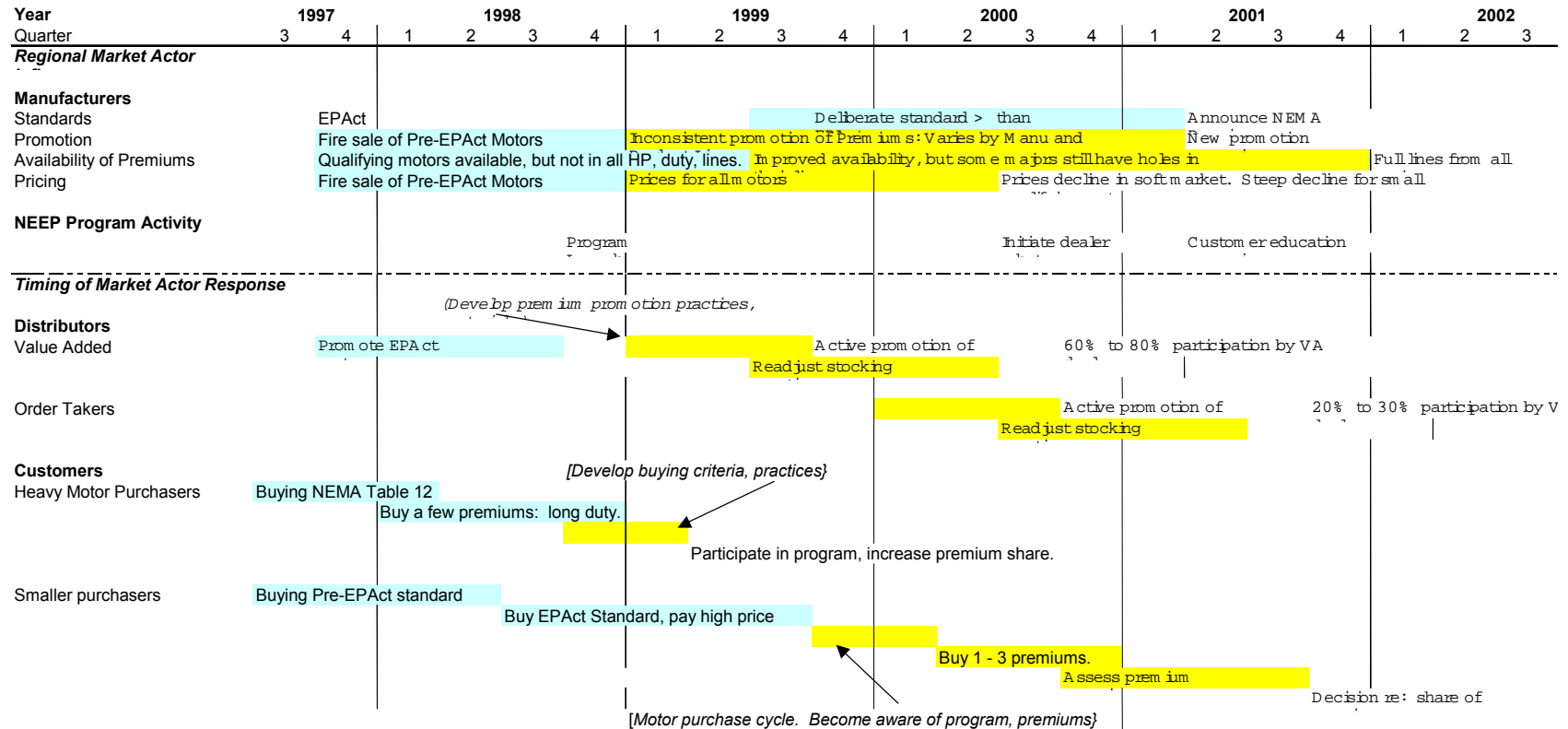
**Timeframe for changes in market actor behavior.** The baseline condition of the Northeast motor markets at the time of the program launch were such that:

- Product designation and availability of premium efficiency motors were sketchy and inconsistent.
- Relatively few customers had knowledge of or interest in purchasing premium efficiency motors.
- Distributors were adjusting to new federal standards and had to develop new approaches for identifying and promoting efficient products for their customers.

As discussed above, manufacturers have begun to make progress in developing the market for premium efficiency motors. Establishing a brand, lowering prices, and filling out lines are

important steps in that direction. The lag in response from distributors and customers is not surprising. It takes time for these market actors who exercise relatively little market power to adjust their commercial practices to conditions and opportunities established through the actions of the manufacturers. To illustrate this point, Figure 6-1 provides a time line of manufacturer and program activities and charts a plausible timeframe for response from various segments of the distributors and customers.

Figure 6-1



## 6.3 RECOMMENDATIONS

### 6.3.1 *Recommendations on Initiative Design*

**Develop a targeted, pilot customer education program oriented to the diffusion of motor purchase policies and fleet management practices.** We believe that the circuit rider approach developed for the Northwest Energy Efficiency Alliance’s “Drive Power Initiative” offers a useful model for augmenting MotorUp’s services and enhancing its effectiveness. We would suggest that the MotorUp sponsors support a year-long pilot effort that features the following:

- Provide on-site assistance to plant managers in adopting and gaining approval for motor purchase and repair policies oriented to increasing the share of premium units purchased and rationalizing replace/repair decisions.
- Use personnel with credibility in the field to provide these services. In the Northwest, circuit riders were drawn from industrial equipment sales staff and other pools of knowledgeable technical sales personnel.
- Adapt existing technical materials to make them easy to use and sell within the organization. These kinds of materials would include simple motor selection worksheets, canned specifications to be provided to vendors, canned motor selection and fleet management policies. Many of these materials have already been developed in the Northwest or by the Motor Challenge program. Additional materials will be developed by the Motor Decisions Matter program of CEE.
- Target assistance to large industrial and commercial organizations that have not yet participated in the rebate program, as well as to medium-sized customers in selected industrial segments that purchase significant numbers of motors.
- Monitor the experience of the pilot for a year. Refine technical materials into a program support package for participating motor dealers so that they can provide enhanced guidance to their customers.

This set of recommendations is motivated by the following observations.

- Despite extensive efforts by utilities and manufacturers, most customers remain very much confused about efficient product identification and appropriate applications of premium motors. Communication of these and related subjects can best be made in person. It is also much more efficient to identify the appropriate individual to receive the information in person, versus via phone or direct mail.
- The customer survey found that purchase of significant numbers of efficient motors and rational rewind practices were associated with development of policies to guide those activities. Personal visits are probably the only way to ensure that the right individuals

receive instruction and materials in regard to such policies and that they are communicated to management.

- Savings available from rechanneling planned motor repairs to replacements significantly outweigh potential savings due to upgrades from EPAct to NEMA Premium™ efficiency levels.
- Motor purchases are highly concentrated among large and medium sized industrial firms and a few large commercial users. Careful targeting of visits to these customers will ensure that a large portion of the market (defined by units purchased) can be visited.
- Information gathered through the visits can be used to support dealer efforts within the program and, if the sponsors are interested, to support program components that address other elements of motor systems.

**Work with manufacturers to coordinate the roll-out of the NEMA Premium™ standard with the program.** The program's customer education and dealer support activities could be greatly enhanced by latching onto a manufacturers brand, and vice versa. The sponsors should seek support from NEMA to include promotion of the NEMA Premium brand in program materials.

### ***6.3.2 Recommendations on Initiative Operations***

**Simplify the rebate and application process.** The record keeping required for the rebate application continues to be a serious barrier to MotorUp operations and the efficient use of field representative time. To achieve an increase in the number of rebates processed, we suggest:

- Convene a task force of utilities, dealers and program contractors to negotiate information needs and application processes.
- Link payment of incentives to timely cooperation in completing applications, once a consensus form and procedures have been identified.

Several of the California utilities allow participating dealers to simply include the value of rebates on the sales invoice to the customer and then pay the dealer the full value of the rebate on the basis of the invoice. This approach cuts out a number of steps in the application and review process. It would then be up to the dealer to make arrangements with the customer to recover costs for non-qualifying units.

The rebate process could be accelerated by providing electronic access to applications and eligibility look-up tables.